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Evaluating the Effectiveness of Rural Development Policy in Meeting Environmental Objectives

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Abstract

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This study aims to evaluate Rural Development Policy (RDP) and its ability to meet environmental objectives at European, national and regional levels. Policy evaluation is necessary to assess the processes and impact of policies and programmes to meet desired outcomes, to further ensure accountability of public funds. There a number of evaluation approaches that have varying abilities to examine the variety of interacting policy determinants. This study explores both quantitative and qualitative methods to evaluate the Scottish RDP Rural Priorities scheme performance for the programme period 2007-2013. The Rural Priorities scheme is an important mechanism for achieving environmental objectives through regionalisation. Spatial econometrics, in-depth interviews, and stakeholder power mapping were used to assess policy determinants, such as; farming characteristics, land capability, designated sites status, and accessibility and population as well as less tangible policy aspects such as; policy design, stakeholder power balances, and governance structures. Furthermore these methods were assessed singularly and in collaboration in their abilities to identify strengths and weakness in RDP participatory and environmental performance. This diversity of information contributes to the European Commission funded research project, SPARD (Spatial Analysis of Rural Development), which aims to help policy-makers understand the causal relationships between rural development measures and their consequences in a spatial dimension.

Declaration

I hereby certify that this thesis, entitled:

Evaluating the Effectiveness of Rural Development Policy in Meeting Environmental Objectives

is the work of the author, except where otherwise stated, and has not been submitted for the award of a higher degree at any other institution. Inputs from co-authors and collaborators are acknowledged throughout.

Anastasia Lucy Yang
The University of Edinburgh, United Kingdom, July 2014

Preface

This thesis is for publication. Each of the chapters in the thesis have also been reformulated into papers and submitted to peer-reviewed journals. For instance Chapter 2 has been adapted to paper format and accepted by the Journal of Environmental Management; as has Chapter 3 to the Journal of Environmental Planning and Management; Chapter 1, 4 and 5 have been reformulated, submitted and are awaiting decisions. Chapter 4 was submitted to the Journal of Environmental Policy and Governance; whilst Chapters 1 and 5, have been submitted to a special issue publication in the Journal of Ecological Indicators.

Each chapter follows a logical progression linking their common aim to examine Rural Development Policy in Scotland and environmental targeting efforts. Due to the common subject matter, some overlap between chapters is inevitable; however this is reduced by each focusing on different data, methodologies and aspects of policy analysis.

The work is predominately that of the author including the literature review, method design, data collection, statistical analysis, and write up. This research also contributes to a larger EU FP7 funded project called SPARD (Spatial analysis of Rural development Measures). The project, co-ordinated by Annette Piorr from the ZALF research institute, had a core aim to develop a modelling tool that will help policy-makers to understand the causal relationships between Rural Development measures and their results in a spatial dimension. Scotland was one of six European case studies to test the applicability of spatial econometrics on the analysis of Rural Development measures. The University of Edinburgh was one of nine partners on the project, and the team consisted of the case study leader Prof. Mark Rounsevell and the author. Therefore the SPARD project team contributed their expertise and support particularly in regards to methods adopted in Chapter 2.

The research was undertaken at the University of Edinburgh, and also includes contributions from the authors supervisors each providing advice, support and feedback for each chapter. Prof. Mark Rounsevell was the primary supervisor and was involved from start to finish in supporting the author develop research questions, design and outputs. Dr. Claire Haggett and Dr. Ron Wilson, as co-supervisors, also provided support and input for each of the chapters.

The Scottish Government, Rural & Environment Science & Analytical Services (RESAS), contributed core datasets for Chapter 2. Furthermore the 61 Scottish Government institutional interview respondents also contributed data for the following Chapters 3 and 4. In addition, further datasets were also provided by Edina; Stuart Macdonald who assisted in the preparation and provision of Scottish agri-census datasets.

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Summary of Thesis Publication Outputs

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Articles in review

Yang, A.L., Rounsevell, M.D.A., Haggett, C., Wilson, R. (2014) Multilevel governance, decentralisation, and environmental prioritisation in rural development policy in Scotland: Is it working in practice? Journal of Environmental Policy and Governance.

Yang, A.L., Rounsevell, M.D.A., Haggett, C. (2014) A Literature Review: Evaluating The Effectiveness of European Rural Development Policies in Meeting Environmental Objectives (Part I), Journal of Ecological Indicators, Special Issue: Examining the Impact of the Spatial Dimension of Rural Development Policies on the example of EU second pillar (2007-2013)

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I have also to thank the SPARD project working team, who have encouraged, supported and taught me throughout. Dr Annette Piorr as the director has also been an inspiration and friend and has encouraged me to think outside the box. The other project members are many to name, but particular thanks to Dr. Sandra Uthes, Dr. Martijn Smit, Dr. Luka Juvancic, Tanja Travnikar, Dr. Meri Raggi and Prof. Davide Viaggi for your direct comments and feedback on this research.

I have also to thank all those that were involved in the initial preliminary scoping investigations including, from the RSPB; Katrina Marsden, Dr. Amy Corrigan, Scottish Government; Elizabeth Boyling, Dr. Kathy Johnson, Paul Gavin, Richard Murray, Edina; Stuart Macdonald, Scotland's Rural College (SRUC); Dr. Davy McCracken, Dr. Alan Renwick, and ex-consultant; Emily Taylor. Furthermore, a huge thank you also goes to all the interview participants who contributed their time, experiences, and expertise towards this investigative project. While names can't be mentioned, I am truly grateful for their participation and honesty that have enabled me to gain a richer understanding of practical policy implementation.

I would also like to thank various friends and family for their patience and support over the last few years. A massive thank you to Dr. Rachel Carmenta, my number one inspiration, and my best friend, you set the standards that I strive for, thank you for your endless advice and encouragement. I would also like to thank Tessa Kipping, Amy Sylvester, Larissa Chambers, Emily Creamer, Dr. Joss Rouillard, Ben Evar, Adrien Roy, Joan and Harry Randall and all the Silburn's: Dad, Jeanette, Eleanor, Genevieve, Rory, Rhiannon, Tallulah, Sebastian, amongst many for their advice and support throughout. However, the two people that deserve my endless gratitude include my mum Sally Roads and my husband Shudi Yang. Thank you both for listening endlessly, encouraging, and comforting me throughout. I owe you both everything. Lastly a thank you to my little baby girl Qiyana Yang, you have been nothing short of perfect, whilst adding no doubt to the challenge, you have also been my main inspiration to succeed.

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Chapter 1:

Introduction:

1. Chapter overview

This Chapter aims to introduce the Rural Development Policy (RDP) and its aim to meet environmental objectives at European, national and regional levels. Policy evaluation is necessary to assess the processes and impact of policies and programmes to meet desired outcomes, to further ensure accountability of public funds. There are a number of evaluation approaches that have varying abilities to examine the variety of interacting policy determinants. This chapter, therefore, explores both quantitative and qualitative methods to evaluate RDP 2007-2013, introducing Scotland's Rural Priorities scheme as a case study.

1.1 Rural development

Rural Development is an evolving paradigm that has changed according to the varied relationships and values between Europeans and the rural environment (Van Der Ploeg et al., 2000). The concept of 'rurality' for instance, has many interpretations, and due to the diversity of conditions across Europe it is difficult to provide a single definitive definition. However, traditionally these 'rural' areas where accepted as places where humans and nature interact, mainly in the form of agriculture or other natural resource production processes (Elands and Wiersum, 2001).

Over time, landscapes and the relationships between rural and urban areas have evolved (Pizzoli and Gong, 2007). The boundaries between urban and rural areas have become further integrated due to processes such as urbanisation, changes in human demographics and globalisation (Swaffield and Primdahl, 2006). All of these have altered the rural economy, and as a consequence, agriculture now playing less of a role (Bollman, 2007; Pizzoli and Gong, 2007). In response to these transformations, a more widely used approach for defining rural areas was developed in 2005 by the OECD based on human population density criteria (see Fig. 1) (Organisation for Economic Co-operation and Development, OECD, 2005).

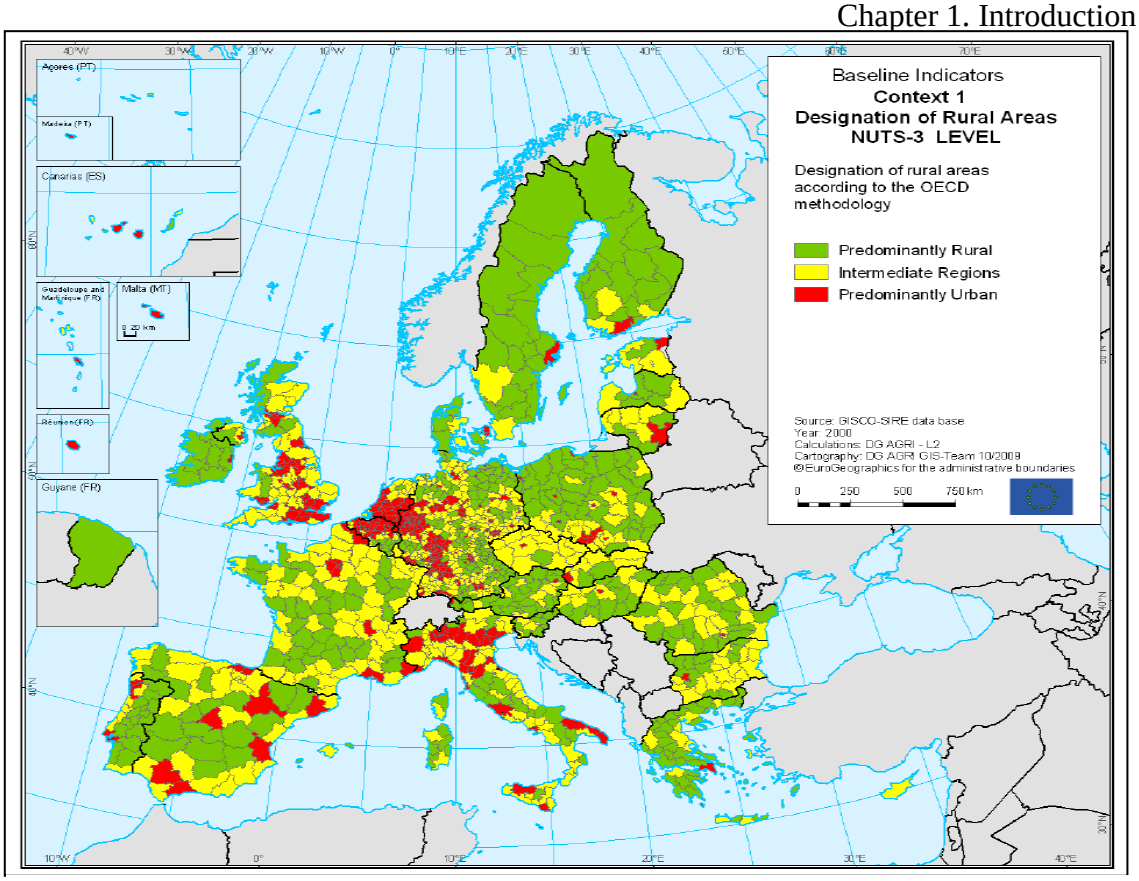

Fig. 2. Designation of EU rural areas based on OECD approach (COM, 2009a)

However due to the diversity of European rural areas, the OECD approach has been further tailored to European Union (EU) conditions by adjusting the population thresholds criteria. This adaptation by the European Commission also allows further statistical comparisons at European, national and regional levels (COM, 2013a). Individual Member States have also adopted a more refined urban-rural classification system; for instance the Scottish Government incorporates both size of settlements and accessibility into its definition (Scottish Government, 2012a).

In terms of 'development', the same complexities exist in its definition; but as a core theme of EU policy and the Lisbon strategy, rural development is proposed as key to promoting 'sustainable development' across Europe (COM, 2006a). 'Sustainable development' is most commonly known as *'meeting the needs of present generations without compromising the ability of future generations to meet their needs'* (WCED, 1987, p.43). This is the overarching aim of all EU policies, and also addressed through the international commitment to the UNDPs (United Nations Development Programme) Millennium Development Goals (MDGs) (COM, 2009b).

The EU is working to foreground the objective of sustainable development into all EU policies and has consequently devised a Sustainable Development Strategy (SDS) in order to accomplish this (COM, 2009b). The SDS framework promotes the view that human progress should incorporate and integrate present and long term objectives, at

local and global levels, with social, economic and environmental issues seen as inseparable and interdependent components (COM, 2009b). Several key challenges were outlined by the SDS: climate change and clean energy; sustainable transport; sustainable consumption and production; conservation and management of natural resources; public health; social inclusion, demography and migration; and global poverty (COM, 2009b). The majority of these challenges, particularly those oriented on the environment, also come under the remit of Rural Development Policy (RDP) (COM, 2006a).

Over the last two decades the European Commission, through its SDS framework and increasing focus on rural development, does at least appear to be meeting its responsibilities. However, whether environmental objectives are actually being achieved in practice is unclear. Agriculture undoubtedly still applies a major pressure on the environment, with changing land practices, primarily as a result of farming intensification, abandonment, and afforestation of poorer land (EEA, 2009). Therefore across Europe, rural policy known as the Common Agricultural Policy (CAP) has a major role in limiting these pressures and encouraging sustainable agricultural practices (COM, 2005).

1.2 The Common Agricultural Policy (CAP)

The proposing, legislation, and implementation of European agricultural and rural policy, known as the CAP, is under the remit of European Commission and the 'Directorate-General for Agriculture and Rural Development'. The CAP is the overarching policy system, and it includes RDP as one of its principal components. Therefore an understanding of the CAP is pivotal to this investigation. It is necessary to understand the history and evolution of agricultural policy within the EU, to be able to evaluate what rural policy means today and in the future. Policy itself can be considered as a *"web of decisions [or non-decisions that] may take place over a long time period"* (Winter, 1996, p.9). This definition of policy is particularly apparent in the story of the CAP over the last few decades.

The CAP was developed in 1957 in the Treaty of Rome, alongside the original formation of the EU. Agriculture was at the centre of the agenda at this time, to ensure post-war food security in the Member States of Europe (Artis and Lee, 1995). In order to achieve this objective, amongst others, the CAP governed the production and marketing of agricultural products, and managing the socio-structural policy and coordinating the process of adapting farm structures (COM, 2001a). These policy

actions are all market based and were known as the 'first pillar' of the CAP (COM, 2001a).

In its first stages, CAP promoted intense production by supporting farms to specialise, guaranteeing fixed prices for their produce, and providing grants and payments (Donald et al. 2002). The CAP was consequently successful in meeting its aims for food security and self-sufficiency (COM, 2001a). However, along with CAP's achievements, a number of disadvantages had also been realised and as a result CAP became increasingly criticised.

1.3 The CAP reforms

Firstly to address structural inequalities, farming within disadvantaged areas was recognised within CAP (IEEP, 2006). Disadvantages related to farms in locations with unfavourable natural conditions such as poor climate, and slope lands, and poor accessibility to markets etc. It is argued that CAP should provide further support to farmers within these areas, in order to maintain rural populations, and protect the environment by sustaining these mostly traditional farming practices (IEEP, 2006; Ruben and Pender 2004). This recognition came in the form of a new measure call Less-favoured areas (LFA) introduced in 1975.

Changes in CAP continued in the 1980's, and a shift started to occur from the 'first pillar' of the CAP, to the 'second pillar' of the CAP which is concerned with 'rural development' as illustrated in Figure 2. These policy shifts have meant that the CAP has undergone a number of reforms, following public and international criticism related to protectionism, expenditure and negative environmental and social consequences (Swinbank and Tanner, 1996; Potter, 1998; COM, 1999a). The reforms consequently aimed to address these criticisms by shifting priorities and changing policy instruments and budget. Such reforms notably include the MacSharry reform, Agenda 2000, and the Fischler that have assisted in the rising importance of rural development within the CAP (Gay et al. 2005).

The MacSharry reform in 1992 for example, saw reductions in price support and increases in direct aid for farmers (COM, 2012a). Furthermore, farmers were encouraged to become more environmentally friendly through compulsory set aside schemes and other policy measures such as agri-environment programmes (COM, 2013b). Following MacSharry, Agenda 2000 saw further emphasis on encouraging farmers to be more market-oriented in addition to forming solid objectives for economic, social and environmental goals. These changes also saw the introduction of the 'second

pillar' of the CAP known as Rural Development Policy (RDP) (COM, 2012a; 2013b). The Fischer reform followed in 2005, and led to the introduction of single farm payments which meant farm income support was largely decoupled from production along with further strengthening of the second pillar (Cunha and Swinbank, 2011)

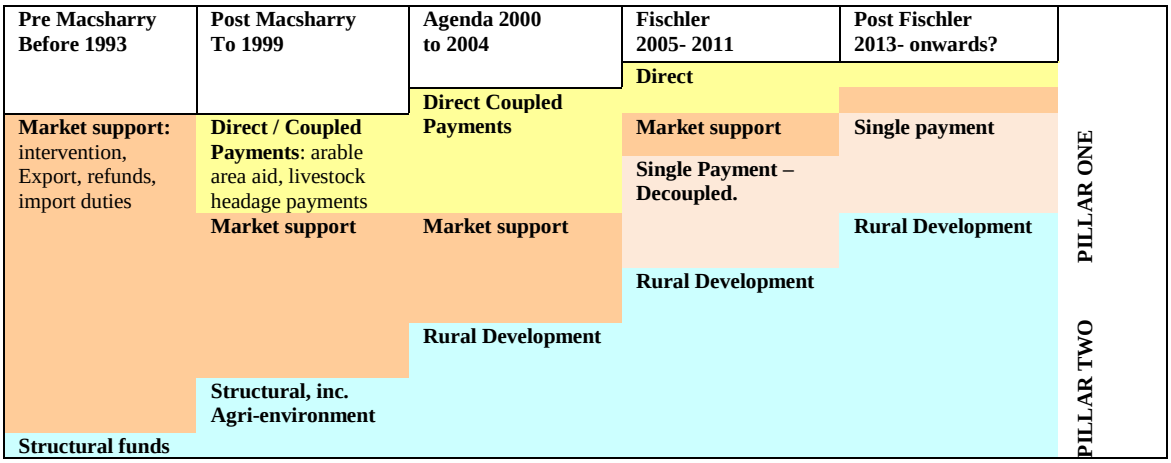

Fig.2. The CAP reforms and associated comparative budgets (adaptation from HSBC, 2010)

1.4 The Rural Development programme (RDP) 2007- 2013

The most recent and relevant change to the CAP is the RDP 2007-2013 (COM, 2009c). The RDP 2007-2013 is mainly a list of measures (a set of 42 altogether) for policy to adapt to changing circumstances within the EU. The aim, as with previous reforms, was not to dramatically change the CAP but work with the current system by streamlining objectives and reducing bureaucracy (Boel, 2007; Cooper et al., 2007). For instance including subsuming the LFA measure into the RDP. Another significant way of achieving this was the introduction of a single funding body: the European Agriculture Fund for Rural Development (EAFRD). This in itself has simplified the monitoring and financial analysis of RDP, compared to the previous programmes (COM, 2006a).

The policy framework for the CAP and the RDP is outlined in Figure 3, indicating main areas of input for the European Commission and individual Member States. Notably, however the European Commission input is constant due to their responsibility for final approval at every step of the RDP policy process.

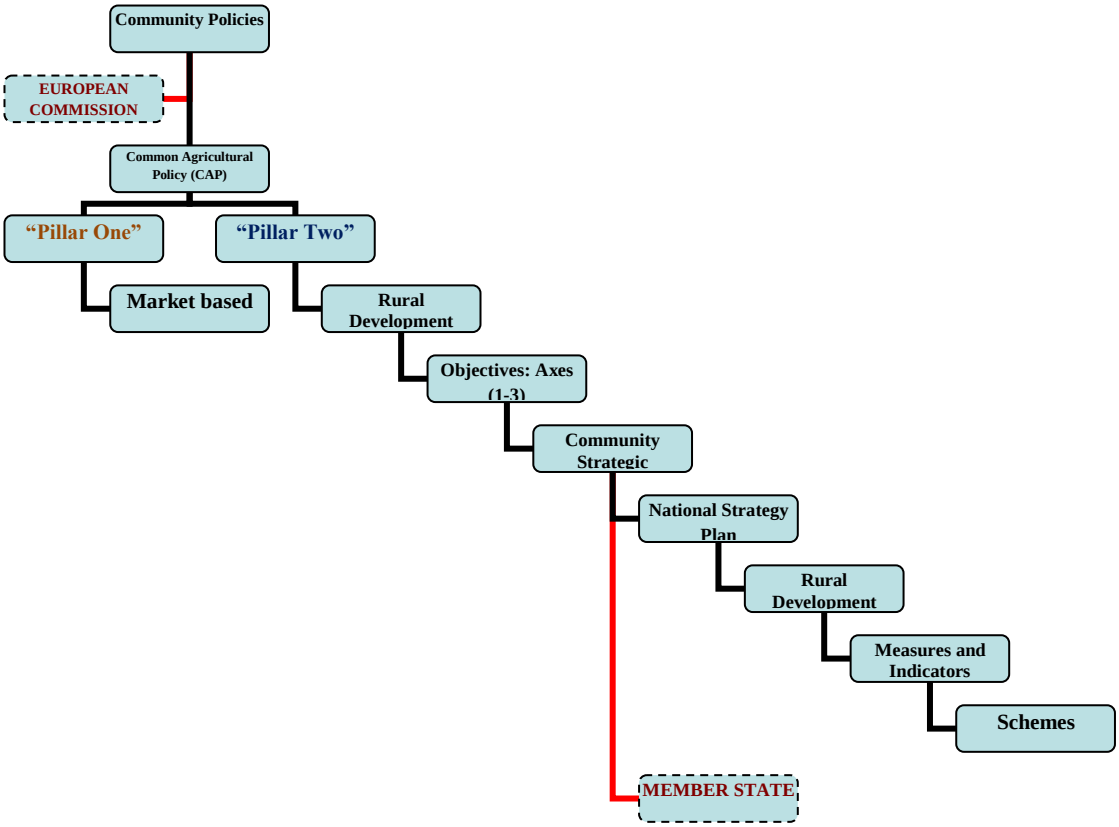

Fig.3. The Common Agricultural Policy and RDP framework

The RDP 2007-2013 is based on essential rules and measures available to Member States, set out in Council Regulation (EC) No. 1698/2005 (COM, 2005). Thereby in the construction of RDPs, Member States are obligated to use the 'thematic Axes' in their RDP design (COM, 2005). There are four 'strategic objectives', known as Axes (COM, 2006a):

1. Improving the competitiveness of agriculture and forestry through support to restructuring, development and innovation (Axis 1);
2. Improving the environment and the countryside by supporting land management (Axis 2);
3. Improving the quality of life in rural areas and encouraging diversification of economic activity (Axis 3); and
4. The LEADER programme which stands for the links between actions of rural development, and encourages local capacity building (Axis 4)

These objectives are the basis for the European 'Strategic Guidelines', which go further to identify priority areas of action (COM, 2005). For instance, the three priority areas as related to Axis 2 include: "*biodiversity, and preservation and development of high nature value (HNV) farming and forestry systems and traditional agricultural landscapes, water, and climate change"* (COM, 2005, p.8). Member States prepared their own 'National Strategy Plan' (NSP), justifying their own nations needs in

alignment with these EU priorities. The NSP recorded the specific situation of that country, in terms of strengths, weaknesses, opportunities and threats and also their potential for development according to their ex ante evaluation (COM, 2005). Consequently the assessment of the programming regions circumstances guides Member States selection of appropriate RDP measures (COM, 2005).

After receiving approval for their NSP, Member States translated these strategies into action through their RDP (COM, 2006a). Member States may have submitted either a single RDP for its entire territory or a set of regional RDPs. For instance, the United Kingdom (UK) has a set of four regional RDPs for Scotland, England, Wales, and Northern Ireland (European Commission, 2003). The RDP should include: 1) justification of the priorities as identified in their NSP; 2) the delivery mechanisms to meet these priorities; 3) and their expected impact. A breakdown of the expenditure per measure is also required in terms of public and private expenditure; as unlike pillar one of the CAP, RDP whilst financed predominately by the EAFRD, needs co-financing by the Member States (COM, 2005).

The amount of further public spending per Member State is dependent on their economic status (convergence or non-convergence[1] region of the EU) and the Axis and measures. For instance the highest minimum funding allocation is required for Axis 2 at 25%, with a maximum of 55% of the EAFRD budget eligible for convergence regions, and 80% for non-convergence regions (Schmid et al. 2010). The funding and eligibility status will be part of the RDP financial plan, which should include the total annual EAFRD contribution, and also the total EAFRD budget for the entire programming period. These European RDP funds should be matched with national public funding, in regards to each Axis, and the amount earmarked for technical assistance (COM, 2005).

1.5 The RDP and the environment

RDP environmental actions come in the form of environmental measures mainly found under Axis 2[2]. This environmental Axis, out of all the Axes, has the highest total EAFRD EU-27 expenditure contribution of 44.1%, (COM, 2009c)[3] highlighting how environmental objectives stand out in terms of relative importance in EU policy. Furthermore Axis 2 contains the one single mandatory measure under RDP: agri-

[1] Convergence regions are those regions having per capita gross domestic product (GDP) less than 75% of the average GDP of the EU-25 (COM, 2006b).
[2] Other environmentally related measures are also present under the other Axes e.g. the treatment of nutrient run-off nutrients and other pollutants measure is found under Axis 1.
[3] These calculations do not include Axes 4, as this is 'horizontal' and are incorporated into the other three axes.

environmental payments (AEP). This measure is also noted by the European Commission as being a key policy action in integrating environmental concerns into the CAP (COM, 2012b; 2012c). AEP is a voluntary measure which provides financial incentives to encourage environmentally beneficial land management activities (COM, 2006a). Such land management activities can be further refined to national, regional, or local level conditions by Member States and can be referred to as 'options'. AEP options can include, for example: support for organic farming, continuation of traditional land management practices, and conservation of high-value habitats and their associated biodiversity (COM, 2012b). The government then pays the farmer to supply environmental goods and services, through these options who may otherwise not supply them (COM, 2012b). Therefore farmers, through sustainable use of agricultural land, are perceived to have a critical role in providing environmental ecosystem services (COM, 2006a). Thus AEP measures can be a used as a targeted tool for reaching environmental goals (COM, 2012b). Consequently this measure with both EAFRD and co-funding amounts to 22 % of the overall RDP expenditure, totalling around €22 billion (COM, 2012b).

Furthermore, due to the voluntary nature of AEP options (i.e. being up to land managers, and in particular famers whether to adopt them or not), the success of AEP option implementation varies widely (Edwards-Jones, 2006). It is up to each Member State how to implement these measures, and crucially, how to make these voluntary options attractive to farmers. In order to make them attractive it is necessary to understand what factors influence individual's decision to adopt AEP option (Edwards-Jones, 2006). Ruto and Garrod (2009) identify a number of variables which may influence the uptake of AEP option by farmers, including socio-demographics and psychological make-up of farmers, farm household characteristics, structure of farm business, other social factors such as networks and finally the characteristics of the policy itself. In their EU survey on farmer's motivations for AEP option adoption, Wilson and Hart (2000) argue that 'economic considerations' are the most important influence for participation. Thus, developing the monetary costs of these public goods by policy decision makers is challenging, particularly as there is no interaction of demand and supply due to an absence of a market (Welsh Assembly Government, 2008). Nevertheless Member State governments are still required to estimate how much consumers would be willing to pay for that public good, and develop a motivational price for land managers to provide the delivery of that good, considering income forgone if they were to participate (Welsh Assembly Government, 2008). Therefore the

policy ramification of Wilson and Hart's (2000) research would imply that if higher payments were provided to farmers, thus making them more attractive, AEP option uptake would increase. However, the co-operation of farmers in such schemes, as argued by Siebert et al. (2006) cannot be attributed to solely one factor, but is an:

> *"intricate interaction of contingencies affected by locality and specific context, such as agronomic, cultural, social and psychological factors. Each of these factors plays interwoven roles in each national, regional and specific farm context. These in turn affect the individual farmer's response to biodiversity-promoting policies for agriculture"* (p.319).

This quote summarises the importance of a need to acknowledge the numerous interacting factors at play that could influence policy adoption. Whilst factors influencing individual decisions of RDP applicants should be considered, so too should factors that influence their eligibility for funding subsequent to how the scheme is framed. Consequently policy analysis "*should draw on ideas from a range of disciplines in order to interpret the cause and consequence of government actions*" (Ham and Hill, 1993, p.11). An interdisciplinary examination into these differing policy influences is a key aim of this study, and accordingly both quantitative methods (i.e. in sections 2.2 and 2.3) and qualitative methods (i.e. in sections 2.4 to 2.4.3) are considered for RDP evaluation.

2. Policy evaluation

Policy evaluation is necessary in order to assess the processes and impacts of European governmental policies and programmes to meet desired outcomes. Policy evaluation is described as:

> *"a range of research methods to systematically investigate the effectiveness of policy interventions, implementation and processes, and to determine their merit, worth, or value in terms of improving the social and economic conditions of different stakeholders"* (Government Social Research Unit, GSR, 2007 p.3).

This comment reflects the aims of this research, although in terms of RDP, and improvements to environmental conditions should also be included to determine the complete 'value' of RDP.

Policy evaluation however is inherently complex due to the number of potential influential factors especially in regards to environmental policy. There are a large number of studies that focus on AEP policy analysis (Hanley et al. 1999; Whitby, 2000; Kleijin et al. 2004; Morris 2006; Franks and Mc Gloin, 2007; Baylis et al. 2008; Finn et al. 2009 etc). These studies, amongst others, highlight the number of problems that exist

in policy analysis, in terms of monitoring and evaluation. The challenges associated with environmental policy analysis should be recognised in order to account for these weaknesses in any investigation. These challenges predominately include (Finn, et al. 2008; OECD, 2009; Bernd Schuh, personal communication, 2010):

1) The absence of clarity from both policy and guidelines to measure progress, especially for AEP;
2) Conflicting objectives and effects in some circumstances between present measures and earlier programmes;
3) The complexity of evaluation and impact i.e. it is difficult to isolate an individual measure from other influential factors (e.g. other policy instruments);
4) Monitoring and other datasets often do not provide a sufficient basis for impact assessment of RDP (e.g. information gap);
5) The time frames of policy measures are still too young to see any significant impacts;
6) An absence of time series data from some indicator datasets, making the measurement of impacts difficult to estimate, when no time scale is available;
7) Incompatibility of available data due to scaling issues, with spatial data inconsistencies and variation in data collection methodologies by Member States and data collection agencies.

To account for some of these challenges and compare policy performances, from local to international levels, the European Commission introduced a consistent system for monitoring and evaluating RDP (COM, 2006a). Therefore Member States are required to provide a number of quantitative and qualitative 'indicators' to assess whether policies are meeting their objectives based on the Common Monitoring and Evaluation Framework (CMEF) (COM, 2006a).

2.1 The Common Monitoring and Evaluation Framework (CMEF)

In terms of AEP indicators, there are many varieties in use which can be used to assess the environmental state and trends, although the effectiveness and reliability of some of these indicators is questionable (EEA, 2009; Langeveld et al. 2007). It is understandable, with the wealth of information on indicators, that there is a necessity for standardised indicators for RDP evaluation. This is demonstrated by the large number of studies and indicators used and the lack of consistency between them (Bastian and Lutz (2006), Bockstaller et al. (2008), Buchs (2003), Buchs et al. (2003), Cabral et al. (2007), Hoft et al. (2010), Langeveld et al. (2007), Lutz and Felici (2009), Menge (2003), Moxey et al. (1998), Onate et al. (2000), Parris (1998), Piorr (2003), Sepp et al. (2005), Wetterich (2003), Yli-Viikari et al. (2007), Zalidis et al. (2004). The CMEF therefore specifies a number of 'common indicators' applicable to each RDP measure, to assess their progress in relation to social, economic and environmental impacts. These indicators are

related to the *baseline* situation as well as to *inputs*, *outputs*, *results* and *impact* of the programmes as illustrated in Figure 4 (COM, 2006a). These indicators are also linked to the hierarchy of objectives, to assist assessment of how policy interventions link to global objectives; known as the intervention logic (COM, 2006a).

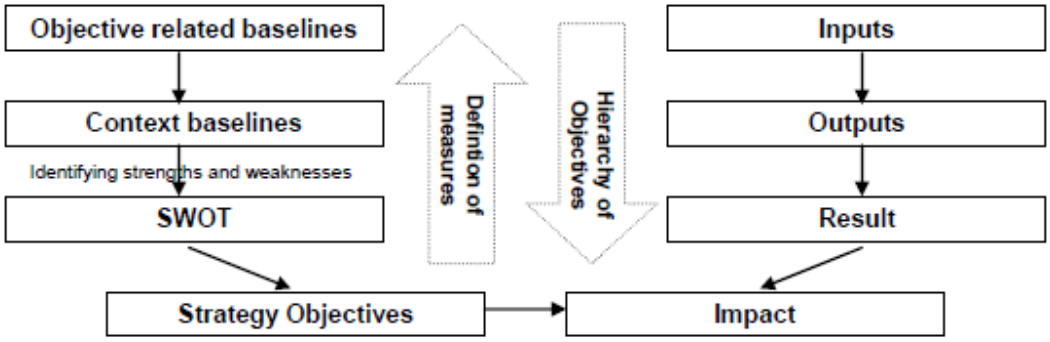

Fig. 4. Intervention logic and the CMEF indicators for RDP 2007-2013 (COM, 2006a)

Firstly the 'baseline' indicators are used by Member States in order to do a SWOT[4] analysis, revealing the economic, social, and environmental conditions (COM, 2006a). Baseline indicators reflect the situation at the beginning of the programming period and are used to help develop the RDP and measure trends over time (COM, 2006a). The baseline indicators have two categories including; 'objective related', which are directly linked to the wider objectives of the programme and used as a baseline in which impact indicators will be compared, and secondly 'context related', focused on the more general contextual trends (COM, 2006a).

'Input' indicators represent allocated funds to each measure or programme reflective of baseline conditions (COM, 2006a). These inputs will generate outputs which are related to the 'operational' objectives of the RDP. The 'output' indicators therefore, are associated with directly measuring the activities within programmes, measured by physical or monetary units such as committed expenditure or numbers of participants (COM, 2006a). Then the subsequent direct and immediate effects of these interventions can be measured using the 'result' indicators, which are connected to the more specific objectives. Result indicators go further to represent the benefits gained by implementation e.g. area of land under successful management (COM, 2006a)

Finally the impact indicator relate to the wider overall objectives as well as being able to link back to the initial needs as identified by the baseline indicators. Thus measures will be expressed in 'net' terms, which means subtracting effects that cannot

[4] SWOT is a strategic planning method used to evaluate the strengths, weaknesses, opportunities, and threats of particular features.

be attributed to the intervention (e.g. double counting, deadweight), and taking into account in direct effects (displacement and multipliers) (COM, 2006a). Such indicators may be for example, the 'maintenance of high nature value farming and forestry areas' or 'change in trend in biodiversity decline as measured by farmland bird species population' (COM, 2006a). Impact indicators can be provided through quantitative and/or qualitative methods (COM, 2006a).

The CMEF is a working guide for all Member States to assess progress, 'efficiency' and 'effectiveness' towards European and national objectives for the RDP 2007-2013 (COM, 2006a). The two terms 'effectiveness' and 'efficiency' are used throughout descriptions on RDP performance and have been used interchangeably in policy analysis. However for this investigation a distinction between the two is necessary as each requires different indicators and specific methodologies in order to measure (Mandl *et al*., 2008).

2.2 Defining efficiency and effectiveness

Firstly, in considering the most appropriate definition for the two terms, the dictionary definition provides a good foundation. For instance the word 'effective' in the Oxford English Dictionary (Oxford University Press, 2010) is defined as *"producing the result that is wanted or intended; producing a successful result"* therefore effectiveness could be interpreted as a measuring whether the results have had the desired effect. The word 'efficient' on the other hand is defined *"as doing something well and thoroughly with no waste of time, money, or energy"* (Oxford University Press, 2010). The dictionary definitions of these words show that whilst both are concerned generally with success of a particular action, effectiveness is determined with resulting impact, whereas efficiency is more closely related to how cost-effective[5] in terms of resource use, those actions have been.

These dictionary definitions give a general perspective on how these two terms are related and also how they differ, but further explanation is required to highlight exactly how to differentiate between the two, and what this means in terms of RDP policy analysis. Mandl's *et al*. (2008) report addresses these issues, and argued that any analysis into effectiveness and efficiency should be concerned with the *"relationship between inputs, outputs and outcomes"* (p.2). This is a core function of the CMEF

[5] Cost- effectiveness is described as the ability to achieve a maximum output for a given financial budget (Drechsler et al. 2007; Klimek et al. 2008).

providing input, output, baseline, results and impact indicators and guidance (COM, 2006a).

Mandl et al. (2008) provide a conceptual framework, as seen in Figure 5, showing the distinction between 'inputs, outputs and outcomes' and their relationship with efficiency and effectiveness. Mandl et al. (2008) suggest the 'input-output ratio,' albeit a basic method is how efficiency can be measured. Simply put, the greater the 'output' for a given 'input' the greater the efficiency of that measure will be. For example efficiency of the RDP AEP measure can be measured by relating the CMEF 'input' indicators on allocated expenditure[6], with the 'output' indicators which represent initial activities such as committed expenditure and numbers of participants. Therefore if the expenditure has met expectations i.e. allocated budgets have been totally committed, than it could be deemed successful. Furthermore this outcome would indicate the 'transactions costs', i.e. those associated with expenditures related to design, implementation and enforcing contractual arrangements, have been successfully kept to a minimum (Beckmann et al., 2009).

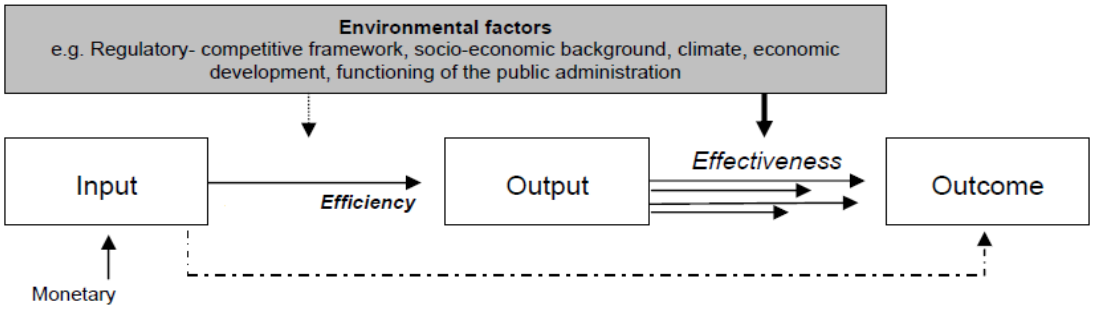

Fig. 5 Conceptutal framework of efficency and effectivness (adaptaion from Mandl et al. 2008)

Effectiveness, within this conceptual framework in Figure 5, is also related to 'input' and 'output' but crucially, in addition, links objectives with the resulting *'outcome'*. For instance, can be assessed in whether the 'outcome' of that measure has met its objectives, for the CMEF these would include the 'result' and 'impact' indicators (COM, 2006a). By using the measure AEP as a continuing example, this would be an assessment to how implementation of this measure has contributed to the overall objective of;

> *"enhancing the environment and the countryside by supporting land management"* with more specific objectives to *"contribute to the priority areas of biodiversity, and preservation and development of high nature value (HNV) farming and forestry systems and traditional*

[6] but also include non-monetary (physical) resources (Mandl *et al*. 2008)

agricultural landscapes, water, and climate change" (COM, 2006a, p.9).

Mandl et al. (2008) also highlight the difficulty in isolating effects to assess efficiency and effectiveness due to external 'environmental factors'. Figure 5 demonstrates the multiple influences possibly outside the control of policy makers that can impact measure *'outputs'* and '*outcomes'* (Mandl et al. (2008). This study aims to identify these determinants in order to improve understanding on how these have impacted efficiency and effectiveness of RDP. However, these influences whether they are recognised as being within the control of policy-makers or not, may be dependent (among other things) on the level of aggregation of that analysis (Mandl et al. 2008)[7]. For example, potential explanatory determinants might be important at one scale level, but not another (Steel and Holt, 1996). This refers to the term 'ecological fallacy' which *"occurs when spatially aggregated data are analysed and the results are assumed to apply to individual relationships"* (Steel and Holt, 1996, p.40). Furthermore, as data is aggregated, information subsequently can be lost (Henderson-Sellers et al., 1985; Meentemeyer and Box, 1987). Therefore this study applies the smallest spatial resolution for analysis in accordance to data availability.

Finally in understanding efficiency and effectiveness, it should be pointed out that while similar in principle, it is still possible to achieve one without the other. Efficiency for instance, might be considered high in terms of the 'input' and 'output' ratio, but the measure in question may still fail to meet its objectives, consequently being ineffective. However, a measure can be effective in achieving the desired 'result' but still be inefficient in its implementation e.g. the 'input' of resources (include expenditure and also time) may have been high in comparison to the 'output'. Furthermore, Farrell (1957) explains the importance for policy-makers of knowing how 'outputs' could be further enhanced by increasing efficiency without using further resources. Policy-makers must therefore decide whether to justify additional expenditure on a measure to improve the 'output', or/and whether attempts to improve the efficiency of a measures implementation and maintenance is required. Essentially the European Commission and Member States should be continually evolving policy in order to make them more 'efficient' whilst achieving optimum 'effectiveness' in meeting both European, national and local objectives.

[7] However for the purposes of this study, data on both the results and impact CMEF indicators were unavailable, particularly in the scale required for the analysis. These data gaps reflect the limitations earlier mentioned.

Hence, policy analysis prior to implementation should account for and mitigate potential implementation issues. Emphasis at this stage should also be on the 'feedback loop' to learn from and link past and present programming features. Building on from past lessons avoids 'path dependency', which would indicate a reluctance to change or reform due to constraints accrued to previous decision-making (Wilsford, 1994). By using an ex-ante (prior to implementation) evaluation should serve as a 'critical mirror' for managing authorities to re-assess for future improvement (COM, 2012d).

In summary, measuring the economic efficiency and effectiveness of policies is an important task for policy-makers in evaluating policy performance and an aim of this study. For policy makers this is necessary to ensure that public funds are being targeted to meet policy needs without excess; in other words to show public accountability that funds are being spent in the most 'cost-effective' manner. As discussed, both policy effectiveness and efficiency can be measured to some extent through quantitative indicators, including those in the CMEF. Schneider, (1986) states "evaluation needs to be viewed as part of an information-producing system which feeds into a cyclical policy-making process" (p.362). Considering the importance of evaluation at various stages of policy cycle it is then the question of the information requested vs availability, and also appropriate methods for collection and analysis. Furthermore recognising that no single evaluation method will be fit for all emphasises a requirement for a range of methods (Pawson, 2002).

2.3 Spatial targeting indicators

Quantitative indicators enable 'statistical generalisations' from findings, and consequently inferences can be made from statistical sampling (Onwuegbuzie and Collins, 2007). The European Commission uses the CMEF for this purpose, defining EU averages of the CMEF indicators to compare conditions and performance across Member States. Quantitative methods are described as a 'positivist approach' concerned with objectivity, replicability and causality (Bryman, 1984). Policy makers are expected to be able to assess efficiency and effectiveness through the CMEF indicators, and to understand the current situation and the ramifications of policy actions with greater certainty (Walker and Young, 1997).

The input and output CMEF indicators, however, only go so far in the assessment of policy performance, but, an understanding of the 'determinants' of uptake and payments could take policy evaluation a step further. An analysis, for instance, of the influence of spatial variability on the uptake and expenditure of RDP measures

would provide insights into 'how' and 'where' these priorities are being met in accordance with policy objectives .

Geographical Information Systems (GIS) provide an opportunity to accomplish this, integrating environmental, socio-economic, and agricultural policy indicators across time and space (Walker and Young, 1997). By using CMEF output indicators and GIS, the uptake of AEP options both in terms of quantity, space, and funding can be compared to spatial targeting objectives. In the past, policy has arguably failed to adopt an integrated approach that accounts for tradeoffs between environmental and socio-economic considerations (Walker and Young, 1997). Furthermore policy relied heavily on aspatial information that *"doesn't account for a more complete understanding of spatial interactions critical to ecosystem function"* (Walker and Young, 1997, p.620). However, there is increasing recognition for the need for empirical information to support policy design to ensure goals are achieved (Piorr, 2003). Consequently a growing number of studies have used spatial analysis as a tool to help define target areas in policy (Walpole and Sinden, 1997; Cook and Norman, 1996; Van der Horst, 2007). However, despite the rising recognition of spatial analysis for policy targeting evaluation, the effectiveness of targeting formulation itself should firstly be considered, as this is an aspect that has been criticised in the past.

Criticism centres on how target areas are defined, as firstly targets areas are seen to be heavily influenced by administrative boundaries, rather than based on cost and benefits; and secondly benefits provided per area do not account for spatial heterogeneity (Van der Horst, 2007). However studies that have accounted for heterogeneity have effectively demonstrated how spatial environmental benefits greatly differ, for example, according to woodland recreation (Brainard, et al., 1999), biodiversity (Van der Horst and Gimona, 2005) and carbon sequestration (Batemen and Lovett, 2000; Van der Horst, 2007). These studies, amongst others, demonstrate the need for improved spatial targeting and analysis in environmental policy.

Additionally it is argued that when quantitative environmental targets are set, these are commonly done inconsistently and without scientific rigour (Tear et al., 2005). Nevertheless such targets are essential for policy makers to justify expenditure and determine goal performance. Tear et al. (2005) claim that *"whereas goals need to be broad and visionary, objectives must be measurable in order to ensure effective evaluation of progress*" (p.837). Tear et al. (2005) outline principles for enhancing science in conservation objective setting, suggesting ideally quantifiable targets are set through a hierarchal process, including a "*broad, visionary, long-term goal; a*

measurable expression of that goal; multiple supporting objectives to meet the goal; and specific performance measures to monitor shorter-term progress toward accomplishing the objectives" (p.837).

These actions can be identified to some extent in the RDP framework guidelines and the CMEF indicators and intervention logic (COM, 2006a). For instance, in RDP the broad goals reflect the Axes and the 'measurable aspect' as the allocated expenditure and expected uptake (CMEF input indicators). The multiple supporting objectives are the measures themselves, whereas the specific performance monitoring could relate to the specific options. However options are drawn up by Member States to fit their own circumstances and are absolved of EU targeting requirements. Therefore in the absence of quantified targets at option level, option design may provide an alternative means to indicate specific objectives. These objectives will reflect applicant eligibility, and will likely be determined by spatial attributes, related to farm types or/and biophysical characteristics.

In summary, despite the risks of setting quantifiable targets, there are specific actions that can be taken in order to minimise them (Tear et al. 2005). For instance, targeting effort can be improved by accounting for heterogeneity of different areas and also by breaking down targets themselves to enable monitoring (Tear et al., 2005). GIS applications would therefore provide the means for a comprehensive RDP evaluation to analyse such targets using spatial information on the current trends for agricultural and rural development, this could be achieved through the application of spatial econometrics, a core method applied in this study.

2.3.1 Spatial econometrics

Spatial econometrics provides an important methodological approach that can account for spatial effects and also identify determinants and evaluate policy performance of both RDP measures and options (Brady and Irwin, 2009). Spatial econometrics is consequently one of the core approaches taken in this study to evaluate RDP.

Spatial econometric modelling is defined as the incorporation of spatial dependence interaction (spatial autocorrelation) and spatial structure (heterogeneity) in regression models (Paelinck and Klaassen, 1979; Anselin, 1988). Spatial heterogeneity refers to variation across space, whilst spatial autocorrelation, considering the first law of geography that *"everything is related to everything else, but near things are more related than distant things"* (Tobler, 1970, p. 236), indicating that data observations are not independent. Alternatively the more commonly used Ordinary Least Square (OLS)

(also known as linear regression) models assume observations are independent from one another. Anselin (1988) warns that if OLS are used on spatially dependent data this can create biased and inconsistent model outcomes, whereas with spatial econometrics, spatial dependency is accounted for and provides better quality models as a result (Kazar and Celik, 2012).

There are, among others, two main types of spatial models: lag and error. The spatial lag model accounts for the dependency of a variable being jointly determined by neighbouring values, referring to a 'spill-over effect' (Anselin et al. 2008). The spatial error model alternatively assumes that spatial dependency occurs in the error terms, indicating that an explanatory variable has been omitted (LeSage and Pace, 2009). Each of the models can be applied, but according to the type of spatial dependency at play, one model may be stronger than the other (Anselin, 1988). It was assumed in this study that RDP participation and expenditure was affected by spatial dependency, this was tested through preliminary diagnostic tests, in addition to the testing of the different models.

In summary, spatial econometrics is potentially able to provide stronger and more reliable models for analysing RDP participation and expenditure by accounting for spatial dependency. These models will then be able to provide a more accurate analysis of how RDP targets for both measures and options have been met, identifying where certain policy decisions have influenced policy outcomes. These will relate quantitative CMEF indicators for AEP measure participation and expenditure, preferably at the lowest disaggregated level, to possible explanatory variables based on socio-economic, agricultural and bio-physical characteristics. Such information would be informative at both regional to national scales on the cause and effect relationships of policy implementation (Piorr, 2003). Consequently, the applicability of spatial econometrics for RDP measure analysis has been tested as a key aim of this study

However despite these strengths, the caveats of using purely qualitative indicators is that the findings may be inflexible in terms of identifying novel or unanticipated findings due to rigidity of understanding phenomena only within the available dataset under observation (Bryman, 1984). Therefore 'other' influencing factors of RDP performance that may only be identified through a more qualitative evaluation approach.

2.4 Qualitative analysis

There has been increasing recognition that qualitative research can contribute to policy formulation, evaluation and refinement, and it is therefore widely employed in policy analysis (Spencer et al. 2003, p.10). For instance in RDP in Scotland, stakeholder interviews have been used to assess policy performance for both the first stage RDP review (Cook, 2009) and the RDP mid-term evaluation report (Scottish Government, 2010a). Qualitative research techniques may include in-depth interviews and other forms of participatory research techniques such as focus group interviews or participant observation. Garbarino and Holland (2009) claim *"these methods are designed to capture judgements and perceptions and allow complex analyses of often non-quantifiable cause-and-effect processes*" (p.7). Therefore this research has expanded the analysis beyond the CMEF and other quantitative indicators, to use qualitative methods: in-depth interviews and mixed methods with stakeholder mapping, to understand wider 'processes' and influences on RDP performance. In particular the research has focused on the influence of stakeholders and governance structures in RDP policy design.

2.4.1 RDP governance and decentralisation

Stakeholders are most commonly defined as *"any group or individual who can affect or is affected by the achievement of the organization's objectives"* (Freeman, 1984 p.46). Stakeholders are increasingly recognised as important in policy outcomes and therefore there are increasing attempts to integrate stakeholders in the policy development and implementation processes (Brugha and Varavasovszky, 2000; COM, 2006a; Scottish Government, 2008). The European Commission introduced the importance of adopting a more inclusive stakeholder approach in policy through the White Paper in 2001 (COM, 2001b). This included promoting the concept of governance defined as *"the means rules, processes and behaviour that affect the way in which powers are exercised"* (COM, 2001b, p.8). Member States were further advised to achieve 'good governance' by following five principles on; openness, participation, accountability, effectiveness and coherence (COM, 2001b).

Governance structures and processes have become ever more important for both describing and proposing centralised and decentralised strategies in policy making and implementation (Berger, 2003). Governance 'structure' refers to the institutional arrangements and inclusivity of stakeholders under new conditions, whilst 'processes' of governance refer to the interaction between these structures. Berger's (2003) review of governance literature identified five governance structures, including; *networks,*

inclusion of wider parts of society, multilevel government, new public management (NPM), and *hierarchies*. Policy design and performance can be examined through these governance 'structures' and 'processes' as outlined by Berger (2003), arguably providing an appropriate framework for policy assessment.

For example, Multilevel governance is arguably a suitable framework for policy analysis in order to understand the "*dynamic inter-relationship within and between different levels of governance and government"* (Bache and Flinders, 2004 p.1). Multilevel governance was defined by the European Commission as; *"coordinated action by the EU, the Member States and local and regional authorities, based on partnership and aimed at drawing up and implementing EU policies"*(COM, 2009d, p.6). This definition of multilevel governance emphasises the inclusive role of each tier of government and identified that the original principles of 'good governance' would still be maintained and enhanced as a result.

However the extent of autonomy to plan, finance, and administer policy at a regional level will depend on the policy structuring and resource provision, as decided by central government (Grocnctulijkll, 1998; de Sadeleer, 2012). For instance, under this ethos, decentralisation should include the transfer of power and resources from centralised governments to local level governments to bring decision-making closer to the citizens (COM, 2009d).

It is debatable whether a more participatory decentralised approach is more suitable for environmental policy or not (Mann and Gennaio, 2010). These debates follow the number of cost and benefits associated with decentralisation. A key argument for more inclusive policy however is that local decision makers are better equipped to understand issues at that level and also enhances implementation and acceptance by citizens and therefore effectiveness (Mann and Gennaio, 2010). This is recognised in the EU policy literature with the promotion of the principle of 'subsidiarity' that acknowledges that decisions be as close to the citizen as possible (COM, 2001b). This has the advantage of avoiding the information costs of knowledge gaps appearing when more centralised authorities attempt to make local level decisions (Mann and Gennaio, 2010).

In contrast, the argument that a centralised policy approach is more appropriate relates to the trans-boundary nature of environmental problems (Dahl, 1994). It is argued again in EU policy documents that environmental matters, go beyond local area, regions, and national boundaries and therefore a common policy is required (COM, 2009d). Moreover a centralised system is needed to ensure environmental issues are

dealt with in their entirety rather fragmented pockets of policy implementation (Falleth and Hovik, 2009; COM, 2009d). In addition, decentralisation is argued to compromise policy efficiency due to the added complexity and costs associated with increased stakeholder involvement (Bovaird, 2005). Therefore whether a decentralised RDP approach is adopted or not by Member States will likely have strong implications on both policy efficiency and effectiveness.

In summary, the effectiveness of attempts to integrate these governance structures and principles into decision-making is yet to be evaluated in RDP, and consequently has also been undertaken by this study. Yet examining a policy system by policy framework alone is insufficient, and requires in addition an understanding of stakeholder interactions in order to identify influences on policy outcomes (Bovaird and Löffler, 2003; Bovaird, 2005). An assessment of how governance works therefore requires the identification of 'who' those stakeholders are and 'how' they interact, and this can be achieved through stakeholder analysis approach.

2.4.2 Stakeholder analysis

Increasing discussion of stakeholder inclusivity by policy makers has in parallel encouraged a wave of research based on 'stakeholder analysis' (Brugha and Varvasovszky, 2000; Reed et al. 2009). The World Bank (2011) describes stakeholder analysis as *"a methodology used to facilitate institutional and policy reform process by accounting for and often incorporating the needs of those that have a 'stake' or an interest in the reforms under consideration* (p.1)*".* The use of stakeholder analysis therefore, is seen to be particularly relevant in relation to environmental and natural resource management due to the cross-cutting nature of the systems which consequentially have an outreach across a large variety of stakeholders (Reed *et al.* 2009). Therefore a stakeholder analysis is another approach adopted in this study to further understand the influences of stakeholders on RDP performance.

Reed et al. (2009 p.1936) categorised the three main aims of stakeholder analysis as: i) identifying stakeholders; ii) differentiating between and categorising stakeholders; and iii) investigating relationships between stakeholders. To achieve these aims there are a number of methodologies that can be used, for example some studies may use a non-participatory approach; relying on their own expertise on the issue supported possibly by secondary data and/or literature to identify stakeholders (Song and Mu, 2012; Njaya et al. 2012). Meanwhile other studies are based on participation of stakeholders or experts (Billgren and Holmén, 2008, Reed et al. 2009). This may add to

complexity of describing a policy system, but will benefit from a comprehensive balancing of claims and interests to achieve wider acceptability (Billgren and Holmén, 2008).

Notably the type of method used for identifying stakeholders and the purpose of the analysis will determine who is, or is not, included (Reed et al. 2009). By including direct stakeholder involvement the risks of excluding marginalised stakeholders through a top-down analytical approach are reduced (Reed et al. 2009). Stakeholder participatory techniques may include interviews or focus groups providing arguably more comprehensive stakeholder identification (Brugha and Varvasovszky, 2000). However, on a more practical level, facilitated participation involvement will also be dependent on resources; such as personnel, finances, and time (Burger et al. 2007). For this study, one-to-one in depth interviews with institutional stakeholders was justified as a suitable method for the purposes of this research. In addition, a stakeholder mapping exercise was incorporated into the interviews to further differentiate and investigate relationships between stakeholders (Reed et al. 2009).

2.4.3 Stakeholder mapping

Stakeholder mapping provides a means for further refinement of the process for identifying stakeholders and their interaction, by differentiating between their attributes (Mitchell et al. 1997). For policy analysis a popular method is identifying levels of 'interest' and 'influence' of stakeholders (Reed et al. 2009; Song and Mu, 2012). Interest refers to the level of importance a stakeholder attaches to seeing a particular objective met, whilst influence refers to the ability of a stakeholder to influence that objective (Grimble and Wellard, 1997). Both positions of stakeholders' interest and influence can be assessed using a 'stakeholder mapping' exercise (Brugha and Varvasovszky 2000; Reed et al. 2009). 'Stakeholder mapping' is noted as an undeveloped research area for exploring roles of government and stakeholders and the balances of power (Bovaird, 2003).

Stakeholder mapping can be a participatory exercise, where identified stakeholders are placed on a matrix according to their relative levels of interest and influence, and which also provides a visual aid for further interview discussions (Brugha and Varvasovszky 2000; Reed et al. 2009). Lindenberg and Crosby (1981) advocate this 'systematic political analysis' to further understand the importance and positions of different actors by gauging their 'importance'. In business management literature this suggests managers could then eliminate the marginal actors and focus on

those considered 'principal decision makers' (Brugha and Varvasovszky, 2000). A potential risk of the mapping approach is the possibility that perhaps previously hidden conflicts of interest will be highlighted and consequently be further exacerbated by the process (Reed et al. 2009). This may be an inherent risk of the process, yet equally it could be argued that identifying such conflicts could be beneficial in terms of the first step towards conflict resolution (Sidaway, 2005). Furthermore by revealing those power imbalances provides an opportunity to address these issues in future policy design, by facilitating empowerment of those who otherwise due to limited resources or information are currently sidelined (Song and Mu, 2012).

In addition, by making power relations explicit and with a suitable sample size, outcomes can also be quantified and analysed statistically to verify hypotheses and enhance findings validation (Reed et al. 2009). However a quantitative analysis of the stakeholder mapping results may also reveal hidden assumptions, therefore the importance of gathering qualitative information is emphasised, alongside any quantitative analysis (Reed et al. 2009). Therefore a triangulated approach which 'seeks convergence on findings' is taken in this research also combining stakeholder mapping quantitative and qualitative findings (Mark and Shotland, 1987).

Stakeholder mapping, in summary, provides a useful tool for understanding policy directions and decision-making capabilities (Varvasovszky and Brugha, 2000). This approach, along with qualitative interviews, will strengthen the understanding of decision-making and power implications on policy outcomes in this research. In order to test the utility of using quantitative spatial econometrics as well as qualitative interviews and stakeholder mapping in RDP evaluation, Scotland will be used as a case study.

3. Case study: Scotland's RDP

This investigation used Scotland as a case study for an in-depth analysis into the applicability of RDP 2007-2013 evaluation techniques to identify the effectiveness of environmental targeting as well as performance determinants. Firstly, the data availability of CMEF indicators on AEP measure and other spatial exploratory variables provided the opportunity to identify farm–level and regional determinants of AEP adoption. In addition Scotland has applied an integrated regionalised RDP delivery approach with strong environmental prioritisation which provided a suitable context for a stakeholder analysis, mapping, and interviews to evaluate governance and decentralisation strategies. The following sections provide a brief background on the

Scottish Rural Development Programme (SRDP), as well as the rural environment. Scotland's RDP Rural Priorities scheme is then introduced as the key delivery mechanism for the AEP measure application. Lastly the adoption of governance principles and decentralisation in the Rural Priorities scheme formulation is discussed, further illustrating the suitability of Scotland as a case study for this investigation.

3.1 Brief background on Scotland's RDP and rural environment

Scotland became responsible for its own RDP after the 1999 establishment of the Scottish Parliament (White and Yonwin, 2004). This allowed Scotland to design a RDP suitable for its own national needs (Scottish Government, 2005). The co-ordination and planning of the SRDP is the responsibility of Scottish Executive Environment and Rural Affairs Department (SEERAD). The total SRDP is worth around £1.7 billion (Table.1) and has incorporated both the European Union (EU) rural development objectives and Scottish national objectives. The RDP 2007-2013 has been developed therefore to deliver on national outcomes, which are intended to benefit the Scottish people by making Scotland; greener, wealthier and fairer, and healthier and smarter (Scottish Government, 2008).

Rural areas are prevalent across Scotland, with 96 % of the land area classified as 'rural' under the OECD rural definition, and consequentially rural regions are considered an integral part of Scotland's economic, environmental and cultural identity (Scottish Government, 2008). Scotland has a diverse range of landscapes, in terms of land cover and land use. The largest agricultural land use is rough grazing (57%), with 24% as grassland, and just 10% used for crops or left fallow (Scottish Government, 2010b). Notably, 'Less Favoured Areas' (LFA) are very important regions in Scotland as they extend across the majority of the countries agricultural land, with 85 % designated as LFA and typically around 13,000 farms and crofts that will apply for LFA support each year (Scottish Government, 2008). This may reflect the low Gross Value Added (GVA) contribution of Scotland's agriculture to the United Kingdom's (UK) total GVA in 2010 at just 0.8 % (£654 million) (Scottish Government, 2010b). This is in despite of a reported 52,000 farm holdings in Scotland in 2010 covering 71.6 % (5.64 million ha) of Scotland's total land area (Scottish Government, 2010b). Agriculture in Scotland is evidently not a strong economic contributor, but it is nevertheless well recognised that rural land managers, such as farmers, are vital in the sustainable care and management of the rural environment (Scottish Government, 2008). Consequently

Axis 2 is a core focus of the SRDP, with 60% (over £1 billion) of the programmes total allocated expenditure (Scottish Government, 2008).

3.2 Scottish Rural Development Programme (SRDP) Framework

The SRDP framework is relatively complicated, compared to other RDP's across Europe, due to the number of different delivery mechanisms (Figure 6). The 'delivery mechanisms' in the SRDP are known as umbrella schemes which implement and allocate funding for the rural development measures. The AEP measure is represented under two of these schemes including: the Land Mangers Options (LMO's) and Rural Priorities (RP) scheme. The RP scheme is however a key mechanism within the SRDP, receiving between 2007 and 2010 the highest committed expenditure at £260.7 million in comparison to the other seven schemes, For example, Land Manager Options scheme had a committed expenditure of £6.4 million, and Less Favoured Area scheme had an expenditure of £146.5 million (Scottish Government, 2010a).

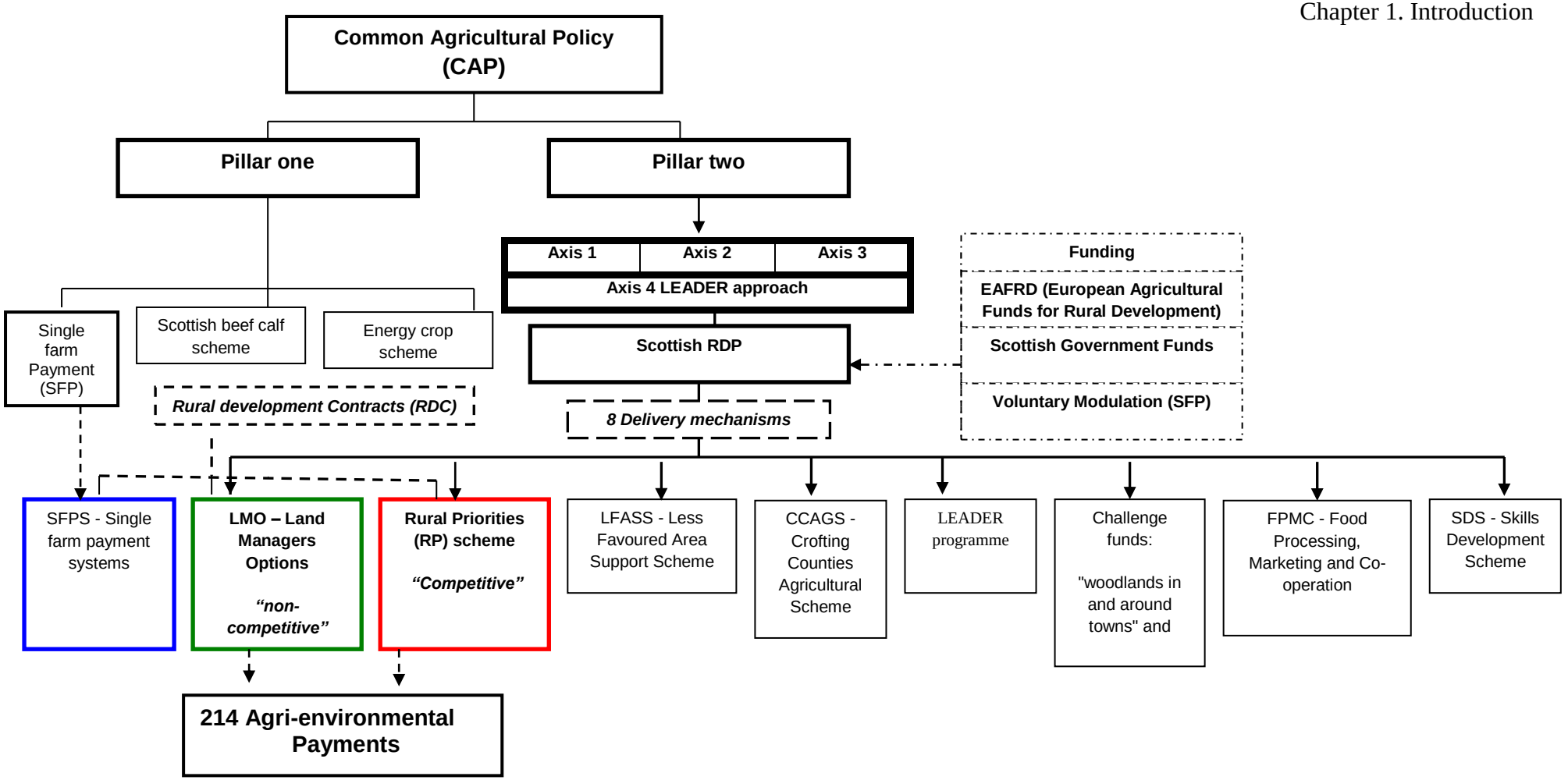

Fig.6. Scottish Rural Development framework 2007-2013

3.3 SRDP environmental targeting

The RP scheme is the most prominent funding support mechanism for the AEP measure in the SRDP. For instance, from 2008 until 2011, AEP had the highest uptake and expenditure of all the RP measures, receiving 39% of the total expenditure for RP (total £158 million) and 77% of the total contracts (total 15,322). This number of contracts far exceeds the CMEF output targets allocated for this measure by 135%[8] (Scottish Government, 2008). There are 68 options and sub options that come under the AEP measure, which each have varying eligibility criteria and management actions to meet either broad or more targeted objectives (Scottish Government, 2008). The number and specificity of options under Scottish AEP measure contrasts to other EU Member States, with broader options based for example on overall biodiversity protection rather than specific species or habitats (Poláková et al. 2011). For Scotland the array and number of options are tailored to address varying needs due to the diversity of Scottish landscapes (Scottish Government, 2008; Poláková et al. 2011).

The policy design of the RP scheme also emphasises a strong regional approach, along with national and regional targets to support environmentally beneficial land management (Scottish Government, 2008). This includes the introduction of eleven regional decision making bodies known as RPACs (Regional Project Assessment Committees), which have been tasked with selecting 'regional priorities' to target the needs of their areas (Scottish Government, 2008). Regional priorities are derived from a menu list of general national priorities, many of which are environmentally focussed and relate to biodiversity, water and soil quality, and climate change (Scottish Government, 2008).

Another newly introduced aspect to RDP within the RP scheme is its implementation as a 'competitive process', where all types of rural land managers, including individuals, businesses and community groups, can compete for funding dependent on their ability to meet these regional priorities of that and other eligibility criteria (Scottish Government, 2008). Furthermore, funding scores are influenced by applicants' ability to meet 'national targets', another component of the scoring system (Scottish Government, 2011a). Six of the seven national targets focus primarily on environmental objectives. For example, activities which will bring or maintain Scotland's nationally important nature sites, such as SSSI's (Site of Special Scientific

[8] The output target indicator was 6,565 contracts for the RDP 2007-2013 (Scottish Government, 2008).

Interest) into favourable condition, and woodland expansion to mitigate climate change, are both national targets (Scottish Government, 2011a).

In summary, environmental targeting and the prioritisation of the AEP measure is evident in Scotland's RDP RP scheme framework. This is in parallel to promoting a decentralised participatory policy with a strong regionalised approach through the introduction of the RPACs. Therefore all these components make Scotland a suitable case study to assess the varying determinants, processes, and actors that may influence RDP performance.

4. Thesis Objectives

As policy influences are multifaceted it is necessary to use a combination of qualitative and quantitative methods to examine determinants of performance in order to understand the strengths and weaknesses of policy in practice. Therefore, this study uses mixed methods: including spatial econometrics, interviews and stakeholder power mapping, to examine the performance of RDP in meeting environmental and objectives in Scotland 2007-2013. Further, it investigates which variables (whether environmental, agricultural or socio-economic), and other less tangible factors such as stakeholders and governance structures, could be considered determinants of option uptake. This research therefore focuses on the following four objectives:

4.1 Identify the quantifiable determinants of the RDP agri-environmental measure uptake and expenditure through the use of spatial econometrics (Chapter 2)

Spatial econometrics has been used widely in regional economics as well as being applied in land use models (Overmars, et al. 2003; Brady and Irwin, 2010). Yet a limited number of studies have applied spatial econometrics in order to evaluate RDP (Schmidtner et al. 2012; Bartolini et al. 2012; Juvančič et al. 2012). Furthermore whilst studies investigating factors of AEP participation are numerous, few have attempted to understand the geographical dimensions of AEP and control for spatial dependence (Evans and Morris, 1997; Hynes et al., 2008; Schmidtner et al. 2012; Uthes et al. 2010).

This chapter therefore used spatial econometrics to investigate the spatial dependency and determinants of the AEP measure uptake and expenditure in Scotland's RDP. For the purposes of this study and according to data availability, seven categories of explanatory variables were explored including: farm type, land ownership, labour employment, livestock density, land capability for agriculture (LCA), designated sites, and the urban rural classifications (incorporating accessibility and size of settlements).

The analysis included variables already identified in the agri-environment literature as arguably important determinants, such as farm characteristics and designated sites (Wilson and Hart 2000: Defrancesco et al. 2008; Hynes et al. 2008) as well as those which have not, such as; the use of the Scotland rural urban, and land capability for agriculture classifications.

In summary, the main three research questions for this chapter include: *1) Are uptake and payments for agri-environment measure and option categories spatially dependent? 2) If so, what are the spatial determinants for uptake and expenditure in Scotland? 3) What impact does the type of model (OLS, lag, and error) have on the model quality? 4) What do these results tell us about the targeting effectiveness of the SRDP?* In order to answer these questions the following methods were applied: the construction of an appropriate spatial weight matrix; identification of spatial autocorrelation of the dependent variables assessing how these variables meet desired policy objectives; and a comparison of model abilities and results between OLS and the spatial econometric models lag and error. This information identified areas and groups of rural land managers and their characteristics for which certain policies have been effective or ineffective, in terms of initial implementation.

4.2 Examine how governance structures and stakeholders influence RDP policy performance (Chapter 3)

The effectiveness of attempts to integrate governance structures and principles into decision-making for RDP is yet to be evaluated and therefore was another core objective of this study. This chapter provides an expansion to the previous spatial analysis approach, by going beyond quantitative datasets to assess the role of governance and power relations of stakeholders in the SRDP through a mixed method approach. Firstly this chapter discusses governance in the EU, based on the principles of good governance and governance structures, providing examples of their application in the context of Scotland's RP scheme (Berger, 2003). Secondly, it reports on research findings from semi-structured interviews and a stakeholder mapping exercise to explore governance issues with key stakeholders in Scotland. Quantitative data is analysed using multivariate statistics to test for differences in interviewees' perceptions according to certain attributes, including, job role, region, and organisation affiliation. In addition, an analysis of the interview data provided in-depth insights into the relationships between stakeholders and how these influence policy implementation, as well as triangulating with data from the stakeholder mapping approach (Reed et al. 2009).

4.3 Identify how environmental targeting and multilevel governance within RDP has been achieved in practice (Chapter 4)

This chapter leads on from the previous chapter to go further in-depth into a single prominent governance structure of Scotland's RDP Rural Priorities scheme. Focussing on purely the qualitative interview findings with institutional stakeholders, an assessment of the application of multilevel governance and decentralisation has been made. To do so, this chapter has explored the following three research questions: *1) How have environmental targeting and multilevel governance been incorporated into RDP design? 2) How effective have these efforts been in practice? 3) What recommendations can be made, if any, to better improve targeting at a regional level?* This chapter therefore firstly discussed the concept of multilevel governance and the relationship between centralised and decentralised decision making and policy effectiveness. Secondly, it examined how EU RDP – and subsequently Scotland's Rural Priorities scheme – has incorporated aspects of a more inclusive governance approach to enhance environmental targeting into its policy design. Thirdly, the chapter reported on results from a qualitative methodology used to assess these efforts, including 61 in-depth interviews with institutional policy stakeholders from both central and regional Scottish Government.

4.4. Provide a synthesis of the three methodologies; spatial econometrics, stakeholder analysis, and qualitative methodologies for RDP evaluation (Chapter 5)

This final chapter synthesises the findings from the three RDP evaluation approaches presented in chapters 2, 3, and 4, including: spatial econometrics, stakeholder analysis, and the qualitative interviews. The strengths and weaknesses of using these different qualitative and quantitative methodologies and their abilities to give in-depth insights into RDP are examined. Additionally the key findings from each of these approaches and future direction of RDP 2014-2020 are identified.

Chapter 2:

Analysing determinants of the agri-environmental measure uptake and expenditure through the use of spatial econometrics

1. Chapter overview

This chapter discusses the application of spatial econometrics, the first of three approaches, to evaluate RDP measure performance. This quantitative spatial approach examines the spatial dependency and determinants of Scotland's agri-environmental measure and categorised options participation and expenditure at the parish level. Spatial econometrics is applied to test the influence of 40 explanatory variables on farming characteristics, land capability, designated sites, accessibility and population. Identification of the influences of spatial variability on the uptake and expenditure of RDP measures provides national insights into 'how' and 'where' environmental priorities are being met in accordance with policy criteria.

2. Introduction

2.1 The Common Agricultural Policy

The European Common Agricultural Policy (CAP) will undergo reforms post 2013 in order to adapt to evolving environmental and economic challenges (COM, 2012e). Alongside the continued economic crisis there is uncertainty about how the balance of environmental and economic issues will be addressed both at the European and national level (Hodge, 2012). The Rural Development Programmes (RDP) (COM, 2012e) are prominent policy mechanisms within the CAP that are designed to meet this challenge. RDPs for the programming period 2007-2013 are based on Strategic Guidelines set by the European Commission, and have three core objectives known as Axes. Whereas Axes 1 and 3 promote 'competiveness' and 'diversification' in rural areas, Axis 2 focuses on 'improving the environment and the countryside by supporting land management'. This includes a number of policy 'measures', which act as instruments for integrating environmental considerations into economic decisions.

2.2 The Scottish Rural Development Programme

Each EU Member State, [in line with the three Axes], has developed its own RDP based on national priorities, with budgets set accordingly (COM, 2005). Scotland's RDP is considered to have an *"essential role in sustaining land-use systems that contribute to the survival of local communities and which are crucial to the delivery of environmental benefits, including the delivery of biodiversity targets and the maintenance of unique landscape character"* (Scottish Government, 2008, p.13). Consequently, the Scottish Government has allocated over £1 billion to environmental policy measures within the RDP 2007-2013 programming period (Scottish Government, 2008). The 'environmental' budget for Scotland's RDP is spread across eight different delivery mechanisms known as schemes, illustrated in Figure 7. Between 2007 and 2010 the Rural Priorities (RP) scheme received the highest committed expenditure in comparison to the seven other schemes, at £260.7 million (Scottish Government, 2010a).

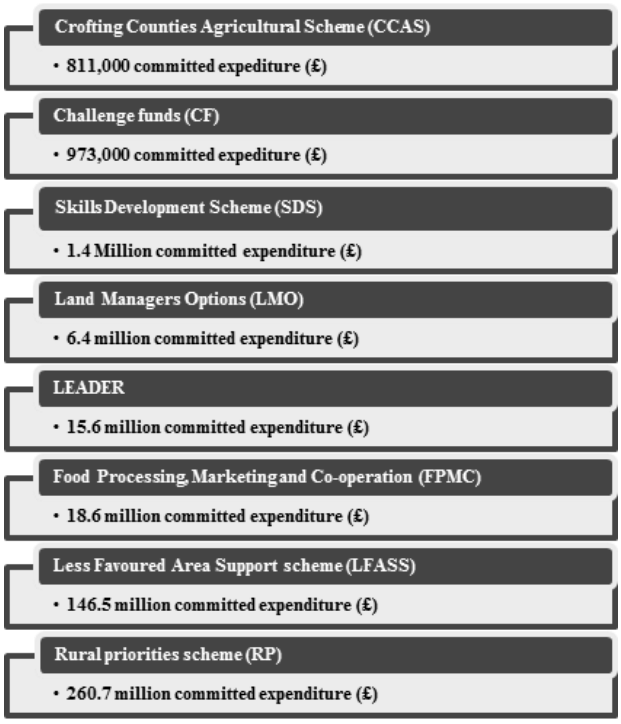

Fig. 7. The eight delivery mechanisms of Scotland's RDP, in order of committed expenditure, from 2007 to 2010 (Scottish Government, 2010a)

The RP scheme is unique in comparison to the other delivery schemes in that it works as a competitive process where the eligibility of rural land managers to receive funding is based on a scoring system. The scoring system assesses the contribution of projects, amongst other eligibility criteria, to quantified national and qualitative regional

targets both of which link to the EU strategic guidelines and objectives (Scottish Government, 2011a). The RP scheme has five environmentally centred measures, including agri-environmental expenditure (AEP) as summarised in Table 1. AEP is outlined in the Council Regulation (EC) No 1698/2005(COM, 2005), and is a broad categorisation of numerous land management strategies known as 'options'. In Scotland there are 69 options and sub-options for the AEP measure. These options range from wetland management to bird species conservation; all options have the common aim of creating, conserving and improving habitats and biodiversity within Scotland (Scottish Government, 2008). The number and specificity of options under Scottish the AEP measures contrasts with other EU Member States, with broader options based, for example, on overall biodiversity protection rather than specific species or habitats (Poláková et al. 2011). For Scotland, the array and the number of options are tailored to varying needs due to the diversity of Scottish landscapes (Scottish Government, 2008; Poláková et al. 2011).

Table 1. Framework of axes, measures and options under the Scotland's RDP Rural Priorities scheme 2007-2013

Axis 1 'Competiveness'	**Axis 2 'Environment'**	Axis 3 ' 'Diversification'
	Axis 2: measures (Total: five)	
	214 - Agri-environment payments (AEP)	
	216 - Support for non productive investments - agriculture	
	223 - First afforestation of Non-Agricultural land	
	225 - Forest-environment payments	
	227 - Support for non productive investments - forestry	
	214 - AEP measure: options (Total: 69 options and sub-options)	
	Management of wetlands	
	Conversion to organic farming	
	Management of cover for corncrakes	
	Control of grey squirrel for red squirrel conservation	
	Hedgerows – 3 years biodiversity benefits etc. ...	

2.3 Evaluating policy measures

The Scottish Government is obligated to evaluate and monitor the performance of the RDP through the Common Monitoring and Evaluation Framework (CMEF) (COM, 2006a). Data on both the number of participants with contracts (uptake) and expenditure of RDP measures are required in the form of the CMEF quantitative indicators (COM, 2006a). Performance can be appraised by comparing these indicators to output indicators, which are nationally pre-set Axes and measure targets (COM, 2006a). Such evaluation may identify 'implementation deficits', describing the gap between policy intentions and actual outcomes (Weale, 1992; Winter 1996; Wilson and Hart, 2000). For

instance, from 2008 until 2011, AEP had the highest uptake and expenditure across the RP measures from each of the Axes; receiving 39% of the total expenditure for RP (total £ 158 million) and 77% of the total contracts (total 15,322), far exceeding the AEP number of holdings output target by 135% (Scottish Government, 2008). These figures indicate that AEP adoption is meeting policy expectations. Yet the level of aggregation of these targets and whole measure analysis does little to allow a deeper understanding of what AEP management activities are being adopted and across which land and farm types.

Further assessment of option adoption, however, demonstrates a large disparity between uptake and expenditure among the 69 options under the RP scheme's AEP measure. For example from 2008 to 2011 the option 'supplementary food provision for raptors - hen harriers' had only 1 applicant and a committed spend of £5,380. In contrast the 'open grazed or wet grassland for wildlife' option had the highest uptake with 2,011 beneficiaries, and over £30 million in committed spend (Scotland's RDP Scottish Government data, 2007-2011). Yet assessing if levels of individual option uptake and expenditure are meeting policy objectives is challenging in the absence of quantifiable targets that do not go beyond the measure itself. Additionally, Potter et al. (1993) argue that "the precision with which target groups or target land are identified will be critical in their success or failure" (p.199).

It is equally challenging, therefore, to assess policy performance regionally because policy priorities are less clear at this level. The spatial distribution of AEP clearly differs across Scotland, e.g. Figure 8 shows the variation in expenditure across the eleven Regional Project Assessment Committees (RPAC) regions of Scotland for AEP. These eleven regions also have varying proportions of Scotland's total UAA (Utilised Agricultural Area). Expenditure could reasonably be assumed to be linked to the proportion of UAA within a region. However, as Figure 8 demonstrates, this is not necessarily the case. For example the Highland RPAC secured a relatively low percentage of funds relative to the proportion of its UAA while the Grampian RPAC is the opposite.

Variation in expenditure across regions, when UAA is accounted for, raises inequity issues for the targeting of expenditure and uptake for AEP. Justification of regional budgets and their targeting performance is uncertain, since in spite of regional targets being established per RPAC, these are qualitative and fairly unanimous across the regions (Scottish Government, 2011a; RSPB 2011).

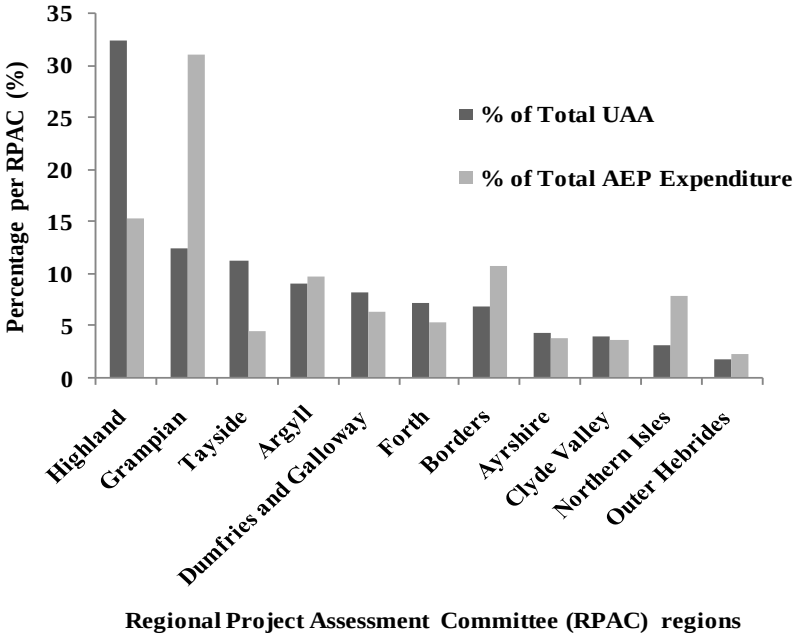

Fig. 8. Percentage of total expenditure for Scotland's RDP AEP measure and UAA per RPAC region, (2008-2011)

Thus, indicators of uptake and expenditure have only limited use in policy assessment. With national targets and regional priorities in the RP scheme, it is only possible to assess if broad objectives are being met (Scottish Government, 2011a). However, an understanding of the determinants of uptake and expenditures would improve policy evaluation. An analysis of the influences of spatial variability on the uptake and expenditure of RDP measures for instance, would provide insights into 'how' and 'where' these priorities are being met.

2.4 Influences of spatial uptake and expenditure extent

The focus of this chapter is on the spatial distribution of uptake and expenditure of the AEP RDP measure across Scotland. In line with available data, seven categories of explanatory characteristics, with expected spatial variation, were explored by modelling their influence on AEP measure uptake and expenditure. Some determinants were chosen because they were identified in previous studies as being important, including farm level variables such as; 'farm type', 'livestock' (Hynes and Garvey, 2009; Wynn et al., 2001); 'labour employment' and 'land ownership' (Defrancesco et al., 2008; Dupraz et al.. 2002); as well as the regional variable 'designated areas' (Wilson, 1997). Additional regional variables such as; land capability for agriculture (LCA) and the

Scottish urban-rural classifications were also included because of their importance in Scotland.

For instance LCA considers the bio-physical constraints on land use based on soil, relief, and climatic conditions (Brown et al., 2008). The classifications relate to the estimated productivity and cropping potential according to those physical features. Classifications rank land capability according to its potential for mixed or arable agriculture, mixed grassland, and rough grazing (JHI, 2011; JHI, 2014). Acknowledging that LCA represents the potential land use as opposed to actual, this provides a more appropriate and up-to-date classification for analysing the AEP measure compared to other available land cover datasets i.e. CORINE Land Cover Map 2007.

The Scottish Government (SG) Urban/Rural 6 fold classification system provides a consistent way of defining urban and rural areas across Scotland. The classification is based upon two main criteria: (i) population and (ii) accessibility based on drive time analysis to differentiate between accessible and remote areas in Scotland (Scottish Government 2010c). Both LCA and the rural/urban classifications are potentially useful indicators for targeting; in identifying how and what LCA types and rural demographic levels, impact AEP participation (Potter et al., 1993).

In the absence of disaggregated quantifiable targets, it is hypothesised that the assessment of policy performance can be achieved by analysing the relationships between spatial characteristics and AEP participation and expenditure. For instance, by linking RP scheme criteria with policy outcomes, such as the criteria defined for scoring and eligibility (Scottish Government, 2011a). For example, one of the national targets links directly with designated areas; supporting activities that will bring Scotland's nationally important nature sites (with SSSIs as nationally designated and SACs, SPAs and Ramsar sites as internationally designated sites[9]) into favourable condition (Scottish Government, 2009). Options related to designated sites attract a higher score and would therefore be prioritised (Scottish Government, 2011a). As a result it is expected, as with Wilson's (1997) findings, that the uptake and expenditure of AEP would be positively related to designated sites due to this targeting emphasis. As SSSIs are the most common of the designated sites, of which there are 1,440 in Scotland, they are assessed separately in this study unlike the merged dataset used for the other designated areas

[9] Site of Special Scientific Interest **(SSSI)** and Special Areas of Conservation, (SAC) are designated sites that support rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds) of European importance, SSSI also protect geological or physiographical features. Special Protection Areas (SPA) support wild birds and their habitats. Ramsar sites are designated areas for wetland conservation (Scottish Government, 2011b).

(Scottish Government, 2011b). This is used to test whether there are differences in uptake and expenditure of AEP according to the type of designated site.

Eligibility for funding is also determined by spatially-related attributes. Farm type and bio-physical characteristics can indicate how individual option criteria affect uptake. The eligibility criteria vary for each individual AEP option, depending on the options objective and management requirements. Option criteria range from being 'narrow and targeted', to the more widely applicable 'broad brush'. For example, a more targeted option includes 'grazed grassland for Corncrakes'. This option is eligible only for grazed farm land within the species distribution target areas e.g. the Western Isles, from 2008 to 2011, had 135 approved contracts (Scottish Government, 2011c). Alternatively hedgerow management' is a more 'broad brush' option and is open to all land managers who have established hedgerows (Scottish Government, 2012b). This option had the highest uptake of all RP AEP options, with 1,601 contracts from 2008 to 2011. This supports the findings of Wilson and Hart, (2001) that more generally applicable options with undemanding entry conditions are more commonly adopted.

Option management demands and labour availability are also potentially related to AEP uptake. Dupraz et al. (2002) suggested conservation intensive option requirements are more likely to be taken up by holdings with an excess of labour. Defrancesco et al. (2008) support this finding, by indicating that non-participating farmers cannot easily satisfy the extra labour required for the AEP paperwork, administration and implementation. Therefore, locations with higher labour densities and the availability of full-time staff would be expected to positively influence AEP uptake.

Land capability for agricultural, determined by bio-physical characteristics, will also influence the eligibility of land areas (Wynn et al. 2001; Hynes and Garvey, 2009; Buchan et al., 2010). For instance the two most prevalent land capability types in Scotland are 'rough grazing' referring to uncultivated land used for grazing livestock, and 'mixed agriculture', which refers to a combination of cropping and livestock, or mixed livestock farming approaches. Both of these farm types are prevalent in land areas with mountainous terrain, poor soils and harsh climatic conditions (Scottish Government 2008; JHI, 2013).

These land capability types are also associated with extensive farming practices, which according to Hynes and Garvey (2009), are more likely to adopt AEP options. Such farm practices are also more likely to include mixed cattle and sheep livestock (Hynes and Garvey, 2009). Moreover, intensive farms are probably less inclined to apply, as this would result in the loss of income when converting areas for AEP

practices (Hynes and Garvey, 2009). In this study, therefore, farms with both rough and mixed land capabilities with extensive farm characteristics were expected to influence positively the uptake of AEP in Scotland.

The potential explanatory determinants, however, might be important at one scale level, but not at another, known as the 'ecological fallacy', (Steel and Holt, 1996). Furthermore, as data is aggregated, information subsequently can be lost (Henderson-Sellers et al., 1985; Meentemeyer and Box, 1987). Thus, in this study, the analysis was undertaken at the smallest spatial resolution dictated by data availability i.e. at the parish[10] level; a spatial unit used in the agricultural census and for the expenditure of farming grants and subsidies.

In order to analyse the determinants of AEP uptake and expenditure, whilst taking account of measure and option distribution, a spatial modelling approach was applied. While previous work on AEP adoption has focused on specific case studies (Ruto and Garrod, 2009; Guillem et al., 2012) there are fewer studies that have attempted to model determinants at a national level (Crabtree et al., 1999, Wynn et al., 2001, Juvančič et al., 2012). This approach could have more resonance with policy makers who need to consider the broader picture. Therefore this study used a countrywide spatial modelling approach to identify determinants of AEP uptake and expenditure across Scotland.

2.5 Spatial econometric modelling

Spatial econometrics has been used widely in regional economics as well as being applied in land use models (Overmars et al. 2003; Brady and Irwin, 2010). Yet a limited number of studies have applied spatial econometrics in order to evaluate RDP (Schmidtner et al. 2012; Bartolini et al. 2012; Juvančič et al. 2012). Furthermore, whilst there are many studies into the factors that affect AEP participation, few of these have attempted to understand the geographical dimensions of AEP and control for spatial dependence (Evans and Morris, 1997; Hynes et al., 2008; Uthes et al. 2010; Schmidtner et al. 2012). Evans and Morris (1997) argued for the necessity of using a geographical approach in order to fully understand the impacts of AEP on "*land use patterns and habitat and landscape conservation"* (p.202).

Spatial econometric modelling is defined here as the incorporation of spatial dependence interaction (spatial autocorrelation) and spatial structure (heterogeneity) in regression models (Paelinck and Klaassen, 1979; Anselin, 1988). Spatial heterogeneity refers to variation across space, and spatial autocorrelation, considers the first law of

[10] There are a total of 891 agricultural parishes in Scotland.

geography that *"everything is related to everything else, but near things are more related than distant things"* (Tobler, 1970, p. 236), indicating that data observations are not independent.

If spatial dependency is detected, the use of spatial models is justified. There are two main types of spatial models; lag and error (Anselin et al. 2008). The spatial lag model adds a spatially lagged dependent variable to account for the dependency of another variable being jointly determined by neighbouring values, known as the 'spill-over effect' (Ward and Gleditsch, 2008; Anselin et al. 2008). Alternatively, spatial error models assume that spatial dependency occurs in the error terms, indicating that a covariate has been omitted (LeSage and Pace, 2009). It is argued that both these models provide better classification and predictive accuracy than linear regression for spatial datasets that exhibit strong spatial autocorrelation (Anselin, 1988; Kazar and Celik, 2012).

Spatial dependency effects need to be clarified to justify the use of either the spatial lag or error models (Partridge et al. 2012; Gibbons and Overman, 2012) by identifying the distinction in 'spatial dependence', i.e. whether dependent correlation is caused by spill-over effects or explanatory variables (Partridge et al. 2012). In this study, it was expected that spill-over effects would be identifiable in a holding-to-holding analysis, for example, the participation of one farmer may lead to AEP uptake by neighbouring farmers (Vehkala and Vainio, 2000; Siebert et al. 2006). However these effects are unlikely to be identifiable at a parish level. Therefore it is more likely that spatial correlation for AEP will be detected and caused by a high correlation in the explanatory variables (Hynes et al. 2006). Therefore spatial error models are expected to be more suitable for this analysis. These hypotheses can however be tested to identify the most appropriate model type (Anselin, 2005).

2.6 Summary of research aims

The novelty of this study lies in the application of spatial econometric modelling to identify spatial targeting of agri-environmental measures. To do this, the study addresses four main questions in the context of Scotland's RP scheme: 1) Are uptake and expenditure for the RP scheme AEP measure and AEP option categories spatially dependent? 2) What impact does the type of model: OLS, lag and error have on the model quality? 3) What are the spatial and non-spatial determinants of participation and expenditure in Scotland? 4) What do these results tell us about the targeting effectiveness of Scotland's RDP? In order to answer these questions the following steps

of analysis were applied: 1) the construction of an appropriate spatial weight matrix; 2) identification of spatial autocorrelation in the dependent variables; 3) a comparison of model performance and results between OLS and the spatial models; 4) identification of significant determinants of participation and expenditure; and, 5) assessing how these variables meet desired policy objectives. Thus, this chapter illustrates the process and detection of spatial autocorrelation, the differing model quality. As well as describing the significant determinants of AEP participation and expenditure examining how these may relate to policy eligibility and scoring criteria.

3. Material and methods

Dependent and explanatory variable datasets were prepared for model analysis. The Scottish AEP measure, as the dependent variable, incorporates a large number and diversity of environmental management options, and consequently a breakdown into option groupings was expected to produce better fitting models. For in comparison to the whole measure analysis, the option groups would further account, at least to some extent, for the differing eligibility criteria and management requirements. The options were classified, therefore, into five groups relating to the main theme objectives: species control (total of 6 options); organic farming (total of 8 options); bird conservation (total of 12 options); water habitats (total of 10 options); and habitat management (total of 32 options)[11]. The total number of participating holdings varied across the option groups as shown in Figure 9. Due to the low uptake for the 'species control' and 'organic' options these were omitted from the analysis.

[11] For further details on each option group categories, see Appendix A

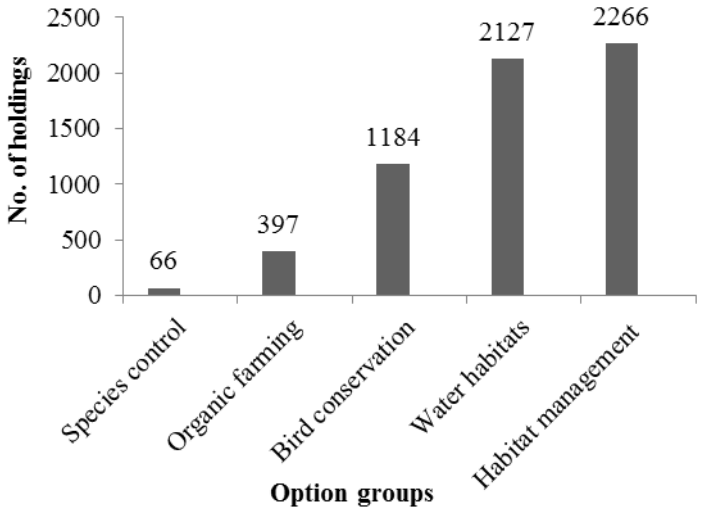

Fig.9. Total number of holdings uptake per category of AEP options in Scotland (Scottish Government data, 2008-2011)

In total, 40 explanatory variables were collected as secondary datasets (summarised in Table 2). These included variables categorised as farm level variables and regional variables such as designated sites, LCA and accessibility and remoteness.

Table 2. Dataset summary: dependent and explanatory variables

Datasets	Description	Data source
Dependent variables (total 8)		
AEP measure **Habitat management** **Bird conservation** **Water habitats**	Two types: i) Payments per UAA ha per parish ii) Percentage of participating holdings per parish	Scottish Government - Scotland's RDP data from 2008 - 2011
Explanatory variables (total 40)		
Farm types (n=11) Rough grazing Crops and grass Grass < 5 yrs old Grass > 5 yrs old Other land Crops and fallow Other crops l Unspecified crops Vegetables Woodland Glasshouses	Proportion of total parish size (ha) e.g. percentage of crops and grass per parish Density of glasshouses is calculated from total number of glasshouses per parish divided by total UAA ha per parish	Scottish Government – agri-census data 2010
Ownership *(n= 5)* Common grazing Owned agricultural Rented agricultural seasonal rented Seasonal let	Proportion of total parish size (ha) e.g. percentage of owned agricultural area per parish	
Livestock (total four) *(n= 4)* Cattle Sheep Beef Heifers Dairy Heifers	Total number of livestock type per parish divided by total UAA ha per parish. e.g. Density of sheep per UAA ha	

Labour *(n= 5)*	Total labour type per parish divided by total number of holdings per parish. e.g. Density of regular and casual staff per holding	
Full-time occupiers		
Part-time occupiers		
Full-time spouses Part-time spouse		
Regular & casual staff		
Land Capability for Agriculture (LCA) *(n=6)*	Based on soil, climate and relief datasets land is ranked on its potential for productivity and cropping flexibility.	James Hutton Institute (JHI) 2011
Arable		
Mixed a		
Improved	Proportion of total parish size (ha) e.g. percentage of land capable for mixed agriculture per parish	
Rough		
Built up areas		
Inland water area		
Designated sites *(n=3)*	Proportion of total parish size (ha) e.g. percentage of SSSI per parish	Scottish Government 2012a and RSPB 2010
SSSI area		
Complete national designated areas		
RSPB reserve areas	Designated sites variable contained the merged classifications: SSSI, SAC SPAs and Ramsar sites (Scottish Government, 2011b)	
Accessibility and population *(n=6)*	Based on population and accessibility to settlements to classify Scotland's rural-urban areas.	Scottish Government 2010
Large urban		
Other urban		
Accessible small towns		
Remote small towns	Calculated as a proportion of total parish size (ha) e.g. percentage of accessible rural areas per parish.	
Accessible rural		
Remote rural		
NB: Further detailed description on the datasets and how each variable was derived can be found in Appendix B.		

Testing for spatial autocorrelation in the dependent variables requires the development of ***W*** (the spatial weights matrix) by applying a theoretical approach that avoids misapplying spatial econometrics (Partridge et al. 2012; Corrado and Fingleton, 2012). Applying ***W*** in an ad hoc way may lead to model deficiencies (Partridge et al. 2012; Corrado and Fingleton, 2012). Therefore the weighting strategy of ***W*** should be applied in order to represent the spatial structure between features that best reflect how they interact with one other by systematically assessing the degree of connectivity between spatial units (ESRI, 2006). ***W's*** were constructed using the parish spatial dataset[12].

The 'Gabriel' ***W*** was considered to be better than the two most commonly used ***W***s, 'queen contiguity' (based on common boundaries and vertices) and 'distance based', since it incorporates the ability to include islands and limit ranges of neighbours between parishes (see discussion in section 4.1, below). The Gabriel ***W*** uses a standardised each row weighting strategy (Gabriel and Sokal, 1969). As with Delaunay triangulation (natural neighbours) the method works as a sub-graph where neighbours are constructed by creating Voronoi triangles from point features, so that each point connected by the triangle edge are considered neighbours (ERSI, 2012).

[12] The ***W*** and models were developed using the R 2.13.1 software (2011) [12]

Once the $\boldsymbol{W}$ was constructed, spatial autocorrelation was tested using Geoda 1.0.1 (2011) to produce a Global Moran's I (Moran, 1948) for each dependent variable. The Global Moran's I, is a statistical measure that takes account of the clustering effects of a given variable between the values sampled at different points in space (Cliff and Ord, 1973). The value can range from -1.0 to +1.0, with positive values indicating spatial clustering and spatial dependency (ERSI, 2012). Furthermore, the spatial significance of clusters (spatial autocorrelation) as well as spatial outliers in the dependent datasets was identified using a Local Indicators of Spatial Association (LISA) test (Anselin, 1995). The LISA test provides a visual map indicating locations of high and low participation and expenditure for AEP.

Identification of the significant explanatory variables per dependent variable was first achieved using the aspatial OLS model forward-backward stepwise function. This function identified the most significant variables and organised them in the most effective order to achieve the 'best model fit' based on AIC (Akaike Information Criterion) (Akaike, 1973; Bozdogan, 1987). The OLS model for multivariate analysis is expressed in equation (1).

$$Y= \beta_0+ \beta_(1) X_1+\beta_(2) X_2+\cdots\beta_(n) X_(n)+ \varepsilon \quad (1)$$

Y represents the dependent variables (the expenditure and participation of AEP and option groups); β refers to the coefficients, which are calculated by the regression; X refers to each of the selected explanatory variables; and ε represents the random error, which refers to the unexplained part of the dependent variable. The results from this analysis were examined to check for multi-collinearity between present variables and spatial dependency of the model residuals using the OLS model definition in Geoda. Furthermore, models for each of the dependent variables were tested with the Lagrange Multiplier diagnostic, which identifies the most appropriate spatial model: lag or error (Anselin, 2005).[13] These tests produced mixed suitability for lag and error according to the dependent variable, and so subsequently both models were used. The same explanatory variables selected in the OLS models for each dependent were used in the spatial lag model and spatial error model. The spatial lag model is expressed in equation (2).

$$Y= \rho WY+\beta_(1) X_1+\beta_(2) X_2+\cdots\beta_(n) X_(n)+ \varepsilon \quad (2)$$

[13] However the diagnostics confirmed that in the majority of cases both models types were significant. Therefore the model analysis proceeded to use both error and lag models.

W refers to the spatial weight matrix and ρ is a 'scalar spatially autoregressive parameter, which determines the importance of spatial lag', also known as "<Rho>" (Paraguas and Kamil, 2005). "<Rho>" measures the average influence of observations from their neighbouring observations. The spatial error model is similar to the original OLS model however the ε error term is altered by adding the ***W*** and lambda as demonstrated in equation (3). Where ε is the vector of auto-correlated error terms, the lambda ʎ is also a coefficient parameter, with μ as a vector of i.i.d errors[14] (Anselin, 2005):

$$\epsilon = ʎ\, W\, \varepsilon + \mu \qquad (3)$$

All the model results were compared and analysed. A distinction between option groups and entire measures was tested to compare model quality, Note that R^2 in the spatial models is comparable, but not for the OLS model as the spatial results produce what is known as a 'pseudo R^2' (Anselin, 2005). Thus, model comparisons were based on the AIC. In order to compare the spatial dependency between the aspatial and the spatial models, the residuals from the spatial lag and error models were tested to compare the Global Moran I results and significance compared to the original OLS model residuals. This was done in order to test whether the spatial models had accounted sufficiently for the spatial dependency.

4. Results

4.1 Spatial weight matrix

The 'Gabriel' ***W*** (spatial weight matrix), illustrated in Figure 10, was developed as an improved alternative to account for the limitations of both the queen contiguity and distance matrixes. The queen contiguity ***W*** was, limited in being unable to include all parishes in the analysis. Results returned 25 parishes with no links and [on the islands] some blocks of parishes connected only to one other. Additionally, 'Distance cut off' presented limitations due to the varying size and number of parishes. This was demonstrated in the distance matrix results that included four parishes with only 1 link, compared with the most connected parish with 147 links to 'neighbouring parishes'

.

[14] i.i.d refers to the independent and identical distribution of random variables

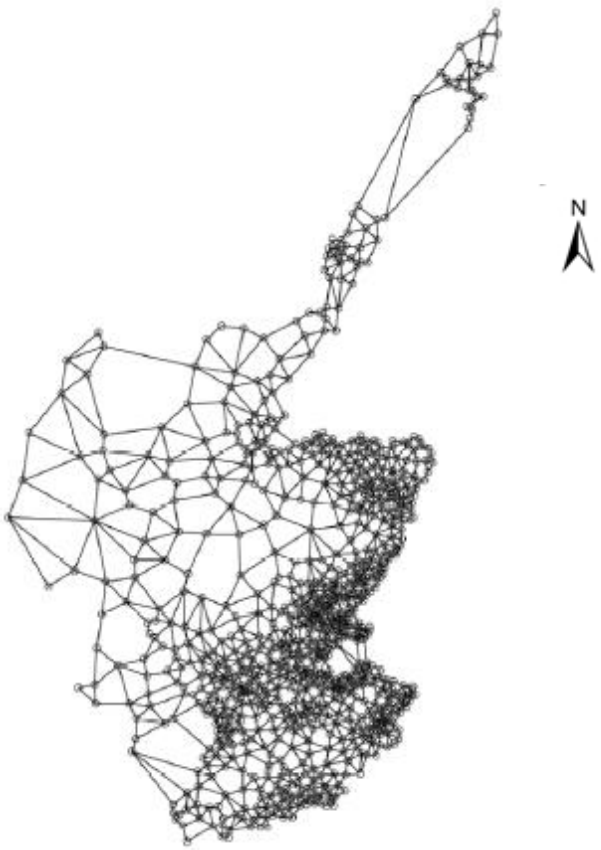

Fig.10. The Gabriel *W* diagram; representing spatial interactions between Scotland's parishes

However the Gabriel ***W*** had the added advantage, as does the Delaunay Triangulation, of not requiring a common border (i.e. islands can be retained) (Gabriel and Sokal, 1969; ERSI, 2012). Additionally, row standardization is used to create proportional weights in cases where features have an unequal number of neighbours, with a total maximum of 8. Therefore Gabriel ***W*** was applied to each of the following spatial tests and models.

4.2 Spatial autocorrelation detection

The spatial autocorrelation test showed that each dependent variable in the OLS models had a significant Global Moran's I, as all the values were positive indicating spatial clustering and therefore spatial dependency. Habitat expenditure had the highest spatial dependency with a Moran's I of 0.46 (Table 3). By contrast, both bird conservation models were weakly significant with a much lower Moran's I at 0.04 for expenditure, and 0.05 for participation. The spatial autocorrelation of the residuals from the OLS model compared to both the spatial models showed that in almost all the models, spatial dependency was accounted for in the spatial lag and error models.

Table. 3 Global Moran's I of Residuals per model			
Models	**OLS Moran's I**	**Lag Moran's I**	**Error Moran's I**
AEP pay	0.38 ***	0.08*	0.08*
AEP %	0.19 ***	0.01	0.02
Habitat pay	0.46 ***	0.09*	0.09*
Habitat %	0.18 ***	0.01	0.02
Bird pay	0.04 *	0.03*	0.01
Bird %	0.05 **	0.01	0.00
Water pay	0.18***	0.05*	0.04*
Water %	0.22***	0.02	0.02
**** p ≤0.05, ** p≤ 0.01, *** p ≤0.001***			

The LISA maps also revealed regional clusters of significantly low and high values as well as outliers (referring to low-high and high–low neighbouring values). As seen in Figure 11, it is indicated that clustering patterns are dissimilar between expenditure and participation results for the whole 'AEP' measure with the exception of clusters of both high uptake and expenditure in the North Eastern Grampian region, and low value clusters in central Scotland. This demonstrates that whilst expenditure and uptake are unequivocally related, i.e. there would be no expenditure without uptake; they are still only related to a certain degree.

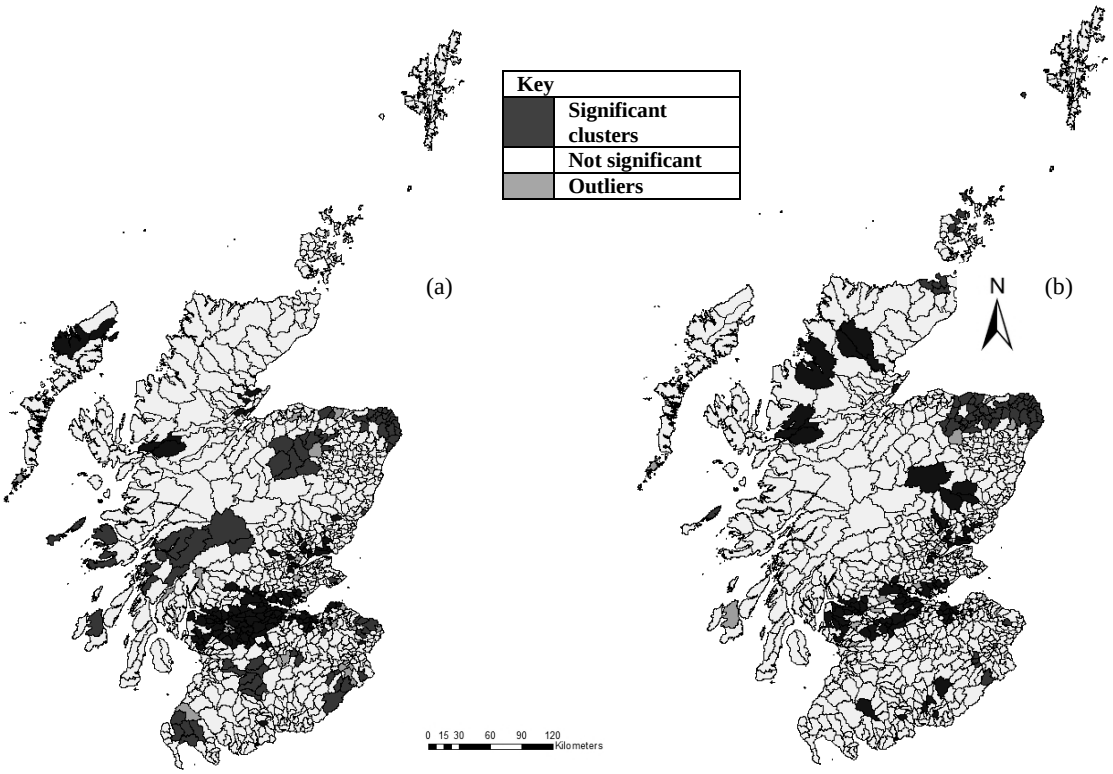

Fig. 11. LISA clustering maps of (a) AEP measure expenditure per UAA ha and (b) AEP measure percentage of holdings 2008-2011. Spatial autocorrelation is demonstrated with the darkened parishes, indicating collections of parishes with similarly high or low values.

4.3 Model outcomes and explanatory variables

The results from all the spatial models per dependent variable had an improved AIC in terms of relative goodness of fit compared to the aspatial OLS models (Fig. 12. For instance, for the OLS habitat management' expenditure model, the AIC was reduced by 211 by the spatial models However the 'bird conservation' models showed the least improvement with the AIC in the spatial models reduced by 5.

The AIC results between spatial lag and error models varied according to the dependents however they were either the same or only marginally different (Fig. 12). For example AIC figures were the same for AEP expenditure and bird conservation participation error and lag models. The AIC for spatial error was smaller for the rest of the participation models, with the exception of the water option group; whereas the AIC for spatial lag was smaller for the other expenditure models.

In comparing the results of the whole AEP models with the option groups, both the model quality and the corresponding explanatory variables differed (Figure 12). For instance, each of the option group models showed an improvement in model quality with lower AICs compared to the whole measure analyses, as shown in Figure 12.

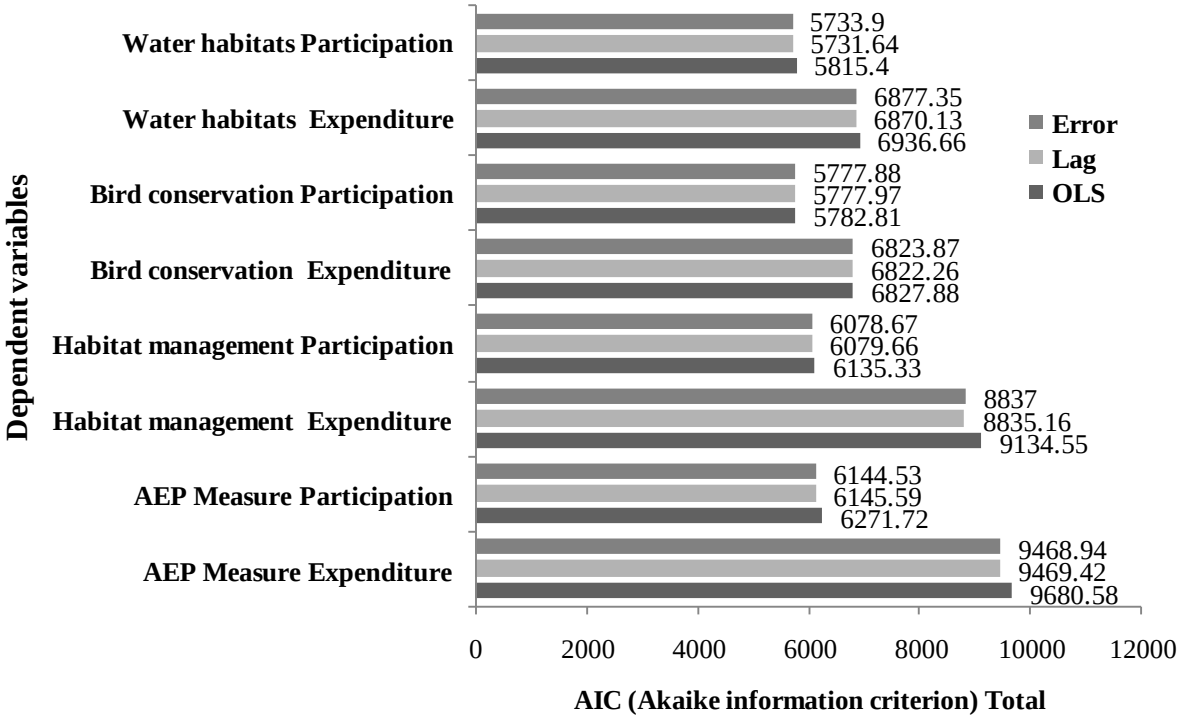

Fig.12. 'Expenditure per UAA' and 'Percentage of uptake' model AIC results for OLS, lag, and error for each dependent category: water habitats, bird conservation, habitat management and AEP measure.

For each model, the explanatory variables differed in number, type, and significance although the same type of relationship (positive or negative) occurred across the model types (OLS, error and lag)[15]. Further reference of the model results refers solely to the spatial error model results as shown in Table 4. This is mainly because the spatial error model was considered to better represent spatial dependency. Whilst the significance of explanatory variables did vary across the lag and error models, this difference was very small and in the majority of cases the same variables remained significant.

The R^2 in the error models were relatively low in the majority of the models e.g. < 0.28, with the exception of higher R^2 values for both AEP (0.37) and habitat management expenditure (0.42). The lambda, representing the coefficient of the spatially correlated errors, was found to have a positive effect and was highly significant in all the models. The variation and significance of the explanatory variables are discussed below.

Table 4. Summary of spatial error model results; significant explanatory variables and coefficients per dependent variable

	AEP pay	AEP %	Habitat pay	Habitat %	Water pay	Water %	Bird pay	Bird %
FARM-LEVEL VARIABLES								
Ownership								
Common grazing							0.08 **	
Owned land							-0.04 **	
Rented agricultural		0.06 **		0.04 *		0.04 **		
Farm types								
Grass land > 5 years								0.08 *
Crops and fallow land						0.12 **		0.18 ***
Unspecified crops			-107.97 ***			-6.05 *		
Vegetables land								-3.16 ***
Other crops			82.68 ***					
Woodland	-0.50 *				-0.17 **			
Labour employment								
Density of Part-time						1.96 *		
Density regular and casual staff		3.32 ***		2.79 ***				2.93 ***
Livestock								
Density cattle				-0.92 **	- 1.13 *	-0.88 ***		-0.73 **
Density of sheep					1.18 ***			
Density of dairy heifers		-5.03**		-4.17 **				-4.02 ***
REGIONAL VARIABLES								
Land capability								
LCA Mixed	0.23 *	0.07***	0.33 ***	0.07 ***	0.08 ***	0.05 ***		
LCA rough	-0.48 ***				-0.07 **	-0.03 **	-0.10 ***	-0.06 ***
LCA arable			0.19 **	0.03**				
LCA improved								-0.03 *
Built up areas	-0.51**				-0.08 *	-0.07 ***	-0.09 **	
Inland water area						-0.25 ***		
Designated areas								
SSSI area	0.69 ***	0.25 ***		0.23 ***	0.24 ***	0.17 ***	0.16 ***	0.16***

[15] For all spatial model results see Appendix C

Designated areas		-0.13 **		-0.14 ***		-0.09 **		-0.09 **
RSPB reserve							0.79 ***	0.16*
Accessibility and population								
Other urban		-0.07 *						-0.07 **
Accessible rural areas	-0.25 ***	-0.02*		-0.03 **	-0.04 **	-0.02 **	-0.03 **	-0.02 **
Lambda	0.54 ***	0.34 ***	0.58 ***	0.33 ***	0.35 ***	0.39 ***	0.10 **	0.11 **
R^2	0.37	0.25	0.42	0.26	0.23	0.28	0.13	0.18
*Key: * p >0.05, ** p> 0.01, *** p >0.001*								

4.3.1 Ownership

For ownership, only three explanatory variables were significant: ‘owned’, ‘rented’, and ‘common grazing’. However, the significance of each differed according to the model dependents. Percentage of ‘rented’ agricultural land had a positive effect across three participation models for the whole AEP measure, habitat management options and water options. Yet percentage of ‘owned land’ and ‘common grazing’ were significant only in the bird conservation expenditure models. As expected, these two variables displayed contrasting relationships, with ‘owned land’ having a negative effect and ‘common grazing’ a positive one.

4.3.2 Farming characteristics and land capability

The six significant farming variables were mostly related to crop types, grassland and woodland. The crop related variables, ‘unspecified’ crop land had a negative effect in both the water habitat management expenditure model and water management participation model. Additionally, ‘vegetables’ were negative, and ‘crops and fallow’ positive in the bird conservation participation model. ‘Crops and fallow’ also had positive significance in the water habitat participation model. Alternatively, the percentage of ‘woodland’ had significant negative association with the AEP expenditure and water habitat expenditure models.

The LCA variables differed in significance across all the models. ‘Mixed’ agriculture had a positive significant relationship for the majority of models, apart from the bird conservation models. Similarly ‘arable’ agriculture had a positive effect in both habitat management models only. ‘Improved grassland’ was only present in the bird participation model and was negatively significant. ‘Rough grazing’ also appeared as a significantly negative variable in five of the models. Additionally both ‘built up areas’ and ‘inland water’ also had negative coefficients.

The labour variables occurred only in the participation models. For example ‘density of regular and casual staff’ had a strong positive significance in all the dependent

models apart from water habitat participation. However, for water habitats, 'density of part-time occupiers' had a positive significant relationship.

For the livestock variables, both density of 'cattle' and 'dairy' were negatively significant. For 'cattle' this determinant was present in the habitat management, water habitat, and bird conservation participation models, as well as the water habitat expenditure model. The 'dairy' livestock variable was present in the AEP, habitat management, and water management participation models. By contrast, the density of 'sheep' was significantly positive in the water management expenditure model only.

4.3.3. Designated sites

The 'SSSI' variable was shown to have a strong positive significance in all the models, although it was absent in the habitat management expenditure model. The 'RSPB reserves' variable was a positive factor in both the bird models only. However 'designated areas' had a significant negative relationship in all the participation models.

4.3.4 Accessibility and population

The two significant variables for accessibility and population included 'accessible rural' and 'other urban' areas. 'Accessible rural' area had a significant negative effect on every model, except for the habitat management expenditure models. Meanwhile 'other urban' areas had a negative effect on the AEP and bird conservation participation models.

5. Discussion

Spatial dependency is present for participation and expenditure in the whole AEP measure and three major option group dependents, which justifies the use of spatial models. Furthermore, the determinants of either AEP participation or expenditure in Scotland vary according to the three major groupings of options. The relationship of the significant determinants with AEP was largely as hypothesised.

5.1 Spatial dependency

Spatial dependency was demonstrated for each dependent variable justifying the use of spatial models, and supporting Tobler's (1970) theory that physical and social phenomena are highly clustered in space. Yet while most of the dependent variables demonstrated reductions in the AIC and the Global Moran's I through the use of spatial models, these reductions were limited for the bird conservation dependents.

This suggests that the use of spatial models only marginally improved model quality for the bird conservation option group. Possible explanations for this could be the

overall participation numbers for this group, or differentiation between option eligibility criteria. For instance, compared to the other dependents the bird conservation group had the lowest total number of holdings at 1,184 compared to habitat management that had almost twice as many holdings at 2,266. This suggests that a certain threshold of uptake could determine the suitability of employing a spatial analysis approach at the national scale. In addition, the twelve bird conservation options each have a large range of eligibility requirements; from the 'broad brush' aimed at wider diversity of farmland bird species to the 'targeted and narrow' aimed at single bird species. For example there are five options specifically targeting corncrake (*Crex crex*) conservation. Corncrakes have a specialised habitat distribution (Scottish Government, 2011c) and this is reflected in the option eligibility. However the most popular bird option; 'wild bird seed mix/ un-harvested crop' also included in this group, has less rigid eligibility criteria. Subsequently this option has, as with hedgerows, been adopted more widely by a large number of holding types, in both improved and arable land capabilities (Scottish Government, 2012b). It is expected, therefore, that an option specific model analysis would be more likely detect stronger spatial dependency.

Nevertheless, despite weaker spatial dependency for the bird conservation option group, the aspatial OLS models and the other dependents had comparatively higher AIC, and so, weaker model quality. However whilst the use of spatial error and lag models was shown to be appropriate, the spatial effects and improved suitability of the error models was not wholly as expected. It was hypothesised, for instance, that spatial dependency at the parish level would arise from an important omitted explanatory variable, which could be addressed through the application of spatial error models. The participation models, in line with expectations demonstrated this, with the spatial error results having the lowest AIC indicating stronger model quality compared to the lag and OLS models. These participation (and spatial error) models also had markedly better model quality, compared with the overall expenditure models. For example, the spatial error model for the AEP participation model was reduced by 3324 compared to the AEP expenditure error model.

It is assumed that the differences in model quality and the significance of the spatial lag models are due to data accuracy between the two variable types. For instance, in order to account for accuracy in the methods each of the variables was standardised: with expenditure to parish UAA size, and participation as proportion of the number of holdings per parish. Yet the analysis was constrained by the available datasets. An alternative for standardising expenditure would be the number of hectares of land under

AEP contract since AEP options are predominantly area based e.g. expenditure per ha (Scottish Government, 2011a). This would provide a more accurate calculation of expenditure per ha compared to the expenditure per total UAA ha, as AEP options are more likely applied to a 'proportion' of a farm holding's land area, rather than to the whole UAA. Alternatively, if AEP and option area coverage datasets were available, model quality could be improved by reducing the AIC of the error model. However the associated explanatory variables would not be expected to alter significantly, as hectares under AEP contracts would still correspond (to an extent) with the analysed UAA parishes.

5.2 Farming and land capability variables

The range of explanatory variables varied according to dependents, but predominately met expectations. This was indicated by the positive significance of 'rented' and 'common grazing' areas, and 'sheep' as well as LCA for 'mixed' farm type as explanatory variables appearing alternately or mutually between the expenditure and participation models. Meanwhile 'cattle' and 'dairy heifer' densities appeared as negatively significant determinants. As expected, these variables indicate characteristics of extensive farming practices, in keeping with Wynn et al. (2001) and Hynes and Garvey (2009) findings, as a positive influence on AEP uptake.

Yet in contrast to expectations 'rough grazing' was a negatively influencing factor in a number of the participation and expenditure models. However, by examining the LISA clustering map (Fig. 4) the visible clustering of patterns in the north eastern region of Scotland provides a potential explanation. These regional clusters appear in areas of predominately 'arable' and 'mixed' farm types, both of which are positive significant variables in the AEP and habitat management models (SNH, 2013). Moreover, these regions also include a high number of applications funded for 'hedgerow development' options. As identified earlier, hedgerow management is one of the most commonly adopted AEP options in Scotland (Scottish Government 2011a).

This observation, on hedgerows options, also indicates the link between uptake and spending patterns with AEP option eligibility criteria. In line with expectations, more generally applicable options such as hedgerows with undemanding entry conditions are more commonly adopted (Wilson and Hart, 2001). Additionally, hedgerow option uptake will be determined by the bio-physical context, as hedgerows are less suited to areas of 'rough grazing'; habitats that are limited by difficult physical and climatic conditions (Scottish Government, 2008).

Overall average uptake and expenditure still occur in rough grazing areas, i.e. in the western and north western regions of Scotland. This is indicated by the lack of significant clusters on the AEP LISA maps. This may also explain why 'inland water' is negatively associated in all the participation models; as 'inland water' mostly in the form of lochs, are prevalent in the rough grazing regions, e.g. the Western Highlands. Additionally where large areas of inland water persist in parishes, agricultural land management will not be viable.

Likewise, the percentage of 'woodland' was negatively associated with AEP and water habitat expenditure. These results were expected as the AEP options are directed at agricultural businesses rather than forestry, with the main forestry related options present in other Axis 2 measures (Scottish Government, 2008).

Labour variables were only significant in the participation models. The density of 'regular and casual' staff showed strong positive significance, which logically indicates that the higher the density of workers in the parish, the higher the number of holding uptakes. This finding corresponds with Dupraz et al.'s (2002) research that argues that AEP participation costs are high and may be dependent on the opportunity costs of on-farm labour. Additionally, results suggest that labour intensive conservation practices are more likely to be taken up by farmers with an excess of labour in times of workload peaks (Dupraz et al., 2002; Defrancesco et al., 2008).

5.3. Regional variables

In terms of accessibility and population, 'accessible rural', and 'other urban' areas both had a negative significant relationship across the expenditure and participation models. This was largely expected since any agri-holding can apply for funding even those classified in urban areas; yet the needs of 'rural' communities are prioritised in the RDP (Scottish Government, 2008). Nevertheless, the rural urban classification variables did not provide as much insight into AEP adoption as anticipated, possibly due to the broad classifications of rural and urban areas. Further differentiation within the area classifications could provide a better understanding of the relationship between AEP, accessibility and population.

However, the explanatory variables related to designated sites did provide insights into the national targeting efforts of the Scottish Government or the Non-Governmental Organisation, RSPB. Only 'SSSI' had a significant positive association, whilst the amalgamated 'designated areas' were significantly negative. This suggests that SSSIs are primarily connected with AEP participation and expenditure, whilst the other

nationally important designated sites such as SAC, SPA's and Ramsar are not. The latter sites are aimed at bird conservation and mostly situated in wetlands, estuaries, and lochs and coastal habitats, which potentially are less suitable for AEP, which probably explains the negative relationship (Scottish Government, 2011b). This explanation is supported further by the negative significance of inland water for participation in water habitat options. Additionally, 'RSPB reserves' had a significant positive relationship in all the bird conservation models. These reserves are privately owned by the RSPB and primarily support bird conservation (RSPB, 2011). This suggests that the RSPB has been successful in gaining contracts and funding for AEP land management that promotes bird conservation.

5. Conclusion

The EU CMEF guidelines require Member States to assess individual RDP measures, as opposed to the individual options (COM, 2006a). The research presented here provides insights into AEP as a whole measure, but also assists in understanding the varying pattern of uptake and expenditure between option groups. Thus for Member States that have, as with Scotland for AEP, a high number and range of options under a single measure, an analysis of option groups could provide more informative insights into policy performance. Alternatively a breakdown into singular options would likely identify more specific trends and perhaps more homogenous distributions of uptake, but as a national policy assessment this would add complexity. For regional decision-makers, however, such as the RPACs in Scotland, an individual option analysis at a regional scale would be more suitable, accounting for the regional diversity in land characteristics and the specifics of option eligibility.

The low predictive capacity of the models meant that a strong explanation of the variance in the dependent variables was not possible. This is consistent with findings from other studies on AEP in which participation in schemes could be attributed to a large number of factors such as policy design, individual behaviour and attitudes (Wilson and Hart, 2000; Siebert et al. 2006; Edwards-Jones, 2006; Ruto and Garrod, 2009). Siebert et al. (2006), assert that participation is likely to be influenced by an 'intricate interaction of contingencies' between many variables. For RP this is especially likely to be the case considering the voluntary and competitive nature of the scheme. For instance, decisions are made by applicants not only about whether to apply, but also by the government authorities who design and implement policy, and assess and score applicant proposals.

In summary the spatial approach has provided broad insights into AEP participation and expenditure determinants indicating how and where policy priorities have been met. In the absence of explicit quantified measure and option targets, spatial econometrics has provided examples of how eligibility and scoring criteria can be used to assist in policy evaluation. The importance of particular explanatory variables such as farming characteristics, land capability, designated sites, and accessibility and population for the corresponding dependent variables of the AEP measure and option group participation and expenditure was, in most cases, as hypothesised. The study has provided, therefore, quantitative evidence about which explanatory variables concerning farm types, labour, and ownership are more likely to adopt AEP, according to option eligibility as well as how these environmentally centred AEP options meet national targets.

For instance, the RSPB and SSSI results indicate that targeting efforts by government and NGOs can be effective. From a policy perspective these are informative results in relation to how national targets are being met. The scoring process is designed to prioritise AEP applications located in SSSI sites, and as the results of this study indicate, this has been effective (Scottish Government, 2009). However the environmental benefits of AEP option uptake at these sites is not yet apparent. Furthermore, the other nationally targeted designated sites (SAC, SPA and Ramsar), were negatively associated with AEP participation, suggesting further policy efforts are required to improve agri-environmental management uptake in these areas.

Furthermore, habitats outside of SSSIs and designated zones, termed here the 'wider countryside', might be at risk of not being sufficiently competitive to receive funding under the current scoring system, despite the capacity to meet option objectives. This suggests that policy targeting for RP may need to develop further towards support for 'wider countryside' applications, in order to promote and manage biodiversity, especially to reduce the impacts of already fragmented protected habitat areas (Sutherland et al. 2006; Jackson et al. 2009).

The results presented here provide a potential policy tool for the evaluation of the extent and expenditure of the RDP measures, contributing to the understanding at a national level of the spatial patterns and determinants of policy implementation. Understanding spatial participation may reduce the risk of 'implementation deficit' by determining how policy objectives in terms of initial uptake and spending are being met. Moreover, understanding the potential determinants could guide and emphasise the importance of future targeting efforts to option level, and make these spatially explicit. Such actions are especially important with respect to the proposed reforms of the CAP,

which aim at ‘encouraging agri-environmental initiatives’ as well as ‘better targeted income support’ looking towards future challenges post 2020 (COM, 2012d; 2012e;). In addition there is a “need for a more radical and geographically-defined strategy of targeting” as argued by Potter et al. (1993, p.200) especially as RDP undergoes reform and proposed CAP spending cuts become reality (Marsden, 2011; COM, 2012d).

Chapter 3:

The implications of stakeholder power relationships within governance structures, and assessment of the EU good governance principles

1. Chapter overview

This chapter explores the implications of stakeholder power relationships within governance structures, and assesses the achievement of good governance principles in the context of the Scottish Rural Development Policy. This mixed method analysis provides an expansion to the previous spatial analysis approach which was restricted by available quantitative indicators and other explanatory variable datasets. These methods however provide the opportunity to explore less tangible policy influences including: various stakeholders influence and interest on RDP participation and environmental targeting efforts.

2. Introduction

In the European context 'governance' is defined by the European Commission as the *"rules, processes and behaviour that affect the way in which powers are exercised at European level"* (Commission of the European Communities, COM, 2001b, p.8). Because of criticism of the traditional, top-down approach to government intervention, the European Commission's White Paper recognised governance as key to effective European Union (EU) policy making and integration, and identified the principles of 'good governance' based on "*openness, participation, accountability, effectiveness and coherence"* (COM, 2001b, p.8). Member States are encouraged to incorporate these principles into their national policies (COM, 2001b; 2009). An example of this is in the Scottish Rural Development Programme 2007-2013 (SRDP), which introduced the Rural Priorities (RP) scheme. The RP scheme brought together three established public organisations; Forestry Commission Scotland (FCS), Scottish Natural Heritage (SNH) and the Scottish Government Rural Payments and Inspections Directorate (SGRPID) for policy delivery, and delegated decisions to regional committees in creating wider stakeholder funding opportunities (Scottish Government, 2008).

There is a need to assess in European policy the implications of adopting centralised and decentralised policy approaches, both in terms of governance structure

and process (Berger, 2003). Moreover, there is a need to assess the evolving power relationships between stakeholders and institutions and various governance structures and processes (Berger, 2003). Bovaird (2005) suggests that this may be achieved through stakeholder analysis and 'influence mapping'. This method can address questions of stakeholder position, interest, and influence as well as provide knowledge on interrelationships and networks (Brugha and Varvasovszky, 2000).

This chapter aims to assess the role of governance and power relationships of stakeholders in the SRDP. The chapter first discusses governance in the EU, based on the principles of good governance and governance structures. Secondly, it provides examples of their application in the context of Scotland's RP scheme. Thirdly it reports on research findings from semi-structured interviews and a stakeholder mapping exercise to explore governance with key stakeholders in Scotland. Multivariate statistics are used to test gathered quantitative data for differences in interviewee's perceptions. These results are triangulated with the analysis of qualitative interview data providing in-depth insights into the power relationships between stakeholders and how these influence policy implementation (Reed et al. 2009).

2.1 Governance principles and decentralisation

In light of criticism of more traditional top-down governance approaches, an EU White Paper proposed reforms to European governance systems, recognising a more decentralised approach as being key to effective EU policy making and integration (Metcalfe, 2000; COM, 2001b; Berger, 2003). This document identified five principles of 'good governance' based on: "*openness, participation, accountability, effectiveness and coherence"* (COM, 2001b). These principles are recommended for application at global, European, national, regional and local levels of government (COM, 2001b).

All five principles are reinforced by the principle of 'subsidiarity', decision making at the most appropriate level from Europe wide to local (COM, 2001b; COM, 2009d). The European Commission recommendations do not dictate the levels at which appropriate policy decisions should be made, which is at the discretion of Member States. However EU policy documents do encourage, where appropriate, a shift from centralised to decentralised policy making, embracing a system based on wider involvement, feedback and networks (COM, 2001b; Bovaird, 2005). Decentralisation is described as the *"process involving the transfer of powers, competencies and resources from the central government… to a level of government closer and more easily influenced by citizens"* (COM, 2009e, p.1).

Yet, with subsidiarity, determining what the 'appropriate levels' are for centralised or decentralised policy can be challenging. For instance, centralised policy-making is thought to be more efficient, in terms of time, money and effort, and to positively impact on coherence and accountability (Mann and Gennaio, 2010). By contrast, a decentralised approach can be more resource intensive due to the added complexity of wider stakeholder engagement (Rhodes, 2006; Mann and Gennaio, 2010). However, by adopting a more inclusive approach, key benefits include greater policy acceptance and longevity can be achieved by creating a more informed and involved public (COM, 2001b; Mann and Gennaio, 2010). Furthermore, incorporating local knowledge can result in more informed policy decisions that better reflect the interests and concerns of those affected (Reitz, 1996; Mann and Gennaio, 2010; Bell et al. 2012).

Mann and Gennaio (2010) argue that it is intuitive that certain policy areas are better dealt with at local levels, as opposed to centrally. Yet some impacts go beyond local, regional and national boundaries, to become 'trans-boundary' issues, which require, as with many environmental problems, an integrated policy approach between the different levels of government (COM, 2012f). This requires a balance between the cost and benefits of centralised and decentralised approaches in order to achieve cross territorial objectives through local action. Such policy actions can be examined through the governance structures and processes in place within the RDP.

2.2 Governance structures and processes

Governance structures and processes have become increasingly important for describing and proposing centralised and decentralised strategies in policy making and its implementation (Berger, 2003). Governance 'structure' refers to the institutional arrangements and inclusivity of stakeholders under new conditions, whilst 'processes' of governance refer to the interaction between these structures. Berger's (2003) review of the governance literature identified five governance structures, including*; networks, inclusion of wider parts of society, multilevel government, new public management* (NPM), and *hierarchies* as summarised in Table 5.

Both structures and processes of governance can evolve over time, leading to changes in stakeholder behaviour, influence and involvement (Berger, 2003; Hudson and Lowe, 2004; Héritier and Lehmkuhl, 2008). These changes can cause policy-making to be inherently conflictual with shifting uneven distributions of power between different policy institutions and actors (Berger, 2003). Thus an understanding of power relationships, in the context of 'structures' and 'processes' of governance as outlined by

Berger (2003), can potentially provide an appropriate framework for policy assessment, and furthermore the identification of opportunities for conflict resolution (Sidaway, 2005).

Table 5. Governance structures; adapted from Berger (2003)

Governance structure	Description
1. Networks	Policy networks are the *"sets of formal institutional and informal linkages structured around...beliefs and interest in public policy making and implementation"* (Rhodes, 2006, p.426).
2. Inclusion of wider parts of society	This approach *"refers to notions of capacity building, inclusions and participation"* (Berger, 2003, p.221).
3. Multilevel government involvement	This is described as the "*coordinated action by the EU, Member States and local and regional authorities, based on partnership …and implementing EU policies*" (COM, 2009d, p.1).
4. New public management (NPM)	Links governance to efficiency and effectiveness of the market economy by incorporating private sector management methods (such as market competition) and incentive structures into public service provision (Rhodes, 1996; 1997; Berger 2003).
5. Hierarchies	Hierarchies describe legislative decisions and executive decisions that steer democratic governmental action at the national and European level (Scharpf, 1997).

2.3 Case study: Scotland's Rural Development Policy

The RDP is a component of the EU Common Agricultural Policy, which is important in the management of natural resources (COM, 2008a). Funded, guided, and to some extent regulated by the EU, RDP's are primarily developed at either a national or regional level to incorporate both EU and national objectives. The formulation of the SRDP 2007-2013 rural priorities (RP) scheme demonstrates evidence of incorporating the European Commission's principles of 'good governance' in addition to each of the governance structures as defined by Berger (2003).

The RP scheme for example, has attempted to strengthen 'networks', by bringing together three governmental organisations; FCS, SNH, and SGRPID for policy delivery (Scottish Government, 2008). Improving inter-organisational 'networks' could potentially ensure 'coherence' across the organisational approaches, for better scheme implementation. Moreover as the scheme is designed to deliver integrated economic,

social and environmental objectives the expertise of each organisation can be utilised (Scottish Government, 2008). However, cultural differences between the organisations could also create conflict (Berger, 2003). Contrasting values and behaviours may reflect uneven distributions of power, creating potential barriers to achieving consistency (Schultz, 1994; Berger, 2003). In order to address these potential issues while enhancing network benefits the three organisations have further core representatives on regional decision making committees.

The 'Regional Project Assessment Committees' (RPACs) are administrative groups responsible for ensuring consistency in scheme management and assessment (Scottish Government, 2012d). Representing eleven regions of Scotland each RPAC has developed regional priorities according to the needs of those areas. Regional expertise from each of the delivery organisations and other committee members is intended to improve policy 'effectiveness' by having in place more informed decision makers for better policy targeting (Berger, 2003; COM 2008). Additionally RPACs also provide an example of a multi-level governance structure that reflects interactions between the EU, central Scottish and regional government levels.

Another new and unique aspect of the RP scheme is its competitive nature. This is consistent with the NPM governance structure by providing incentives for public service provision and identifying and funding better quality projects (Berger, 2003). RP scheme applicants are invited to submit proposals for scheme funding by adopting one or more environmentally oriented land management 'options', and may then compete for funding having met certain eligibility and scoring criteria (Scottish Government, 2012d). Successful proposals are expected to contribute to national and regional priorities, demonstrate value for money and manage risk effectively (Scottish Government, 2012d). The process is further controlled by government adjustments of scoring thresholds set by the National Project Assessment Committees (NPACs), based on the quantity of applicants and budget availability during each assessment round (Scottish Government, 2012d).

Moreover, the eligibility of applicant types has been extended, which is consistent with Berger's (2003) governance structure of inclusion of wider parts of society. Previously, the RDP was focused on the farming community, but rural businesses, land managers and community groups are also now able to submit proposals (Scottish Government, 2012d). However, as the majority of policy options relate to agricultural practices, the level of wider applicability and inclusivity proposed by the scheme is yet to be determined.

Hierarchies are inevitably present within EU policy and also therefore in the RDP (Berger, 2003). This is particularly relevant to policy evaluation where the SRDP is subject to EU audits and if in breach of EU rules financial penalties may be incurred by central government, known as 'disallowances' (Scottish Government, 2011d). Such regulatory procedures aim to enhance coherence and accountability between the expenditure of Member States (COM, 2008a). However, these checks are thought to also change the behaviour of applicants and institutional stakeholders because of the fear of financial repercussions (Héritier and Lehmkuhl, 2008).

Hence, the effectiveness of attempts to integrate these governance structures and principles into decision-making is yet to be evaluated, which is the principal aim of this study. Identifying the implications of these structures and processes is not possible by observing policy frameworks alone. Consultation with stakeholder with direct experience of the scheme is needed to further understand how compromises have worked in practice, and how stakeholders have shaped that process. Stakeholders are commonly defined as *"any group or individual who can affect or is affected by the achievement of the organization's objectives"* (Freeman, 1984, p.46) and in order to assess governance systems adequately, it is necessary to identify 'who' are the stakeholders and 'how' they interact in making decisions (Pahl-Wostl, 2002).

3. Methodology

3.1 Research design and data collection

This study applied a mixed method research design based on reviewing the SRDP policy literature (Scottish Government, 2008; Cook, 2009; Scottish Government, 2012d *etc*.) and conducting pilot interviews. Thirteen face-to-face, semi-structured pilot interviews were conducted to assess the feasibility of the interview process, test key questions, and to identify reoccurring themes. Interviewees were selected to include a wide a range of stakeholder types (including land managers, institutional stakeholders, and advisory groups). The interview outcomes were used to develop the stakeholder mapping approach.

The initial research stage confirmed 'institutional stakeholders' (i.e. those working within the Scottish Government) as suitable participants for the second stage of the study, mainly due to the diversity in job roles, organisational affiliation, and direct involvement in implementing the scheme at varying scales. Furthermore the literature review identified a lack of studies that address the perceptions of those involved in administering the RDP, since most previous studies focus on the recipients of RDP

grants (Siebert et al., 2006). Consequently, institutional respondents were selected according to a non-random sampling scheme, based on three attributes: job roles, organisation and RPAC region to further refine stakeholder identification and interactions (Mitchell et al. 1997).

The second stage of the research involved face-to-face, semi-structured interviews following the sampling scheme. Open ended questions allowed respondents the freedom to explore issues they felt important in relation to the RP scheme drawing on their experience and perceptions with respect to Berger's (2003) governance structures.

A 'stakeholder mapping' approach was developed as part of the quantitative aspect of the second stage of the study, which was used to identify and differentiate the levels of 'interest' and 'influence' of RP scheme stakeholders (Reed et al. 2009). Interest was defined as: the amount of professional or personal interest a particular stakeholder may have in the number and type of options taken up within their RPAC area. Influence was defined as: the amount of influence that stakeholder may have on the number and type of options taken up successfully in their RPAC area. Respondents identified and ranked stakeholders according to the definitions of interest and influence.

Reed et al. (2009) argue that stakeholder mapping information may contain hidden assumptions, which can be addressed by capturing qualitative information from the interviews. Hence the stakeholder mapping worked as a visual tool in the interviews to open up discussions with respondents on the positioning of stakeholders. This included asking the respondent to explain their choices, to how influence and interest had changed over time, and what ideal change they would like to see. This, supportive questioning was used to verify the respondent's mapping choices through triangulation. Furthermore in the final stage of the exercise stakeholder choices were reviewed and further modified according to respondent preferences (Reed et al. 2009).

3.2 Data analysis

A total of 61 interviews were conducted between August 2011 and May 2012, covering 69% of the sample scheme, with 55 respondents completing the stakeholder power mapping exercise. The narratives from the semi-structured interviews were fully transcribed, coded and analysed with Nvivo (9.1.106.0).

Data collection from the stakeholder mapping exercise was achieved by quantifying the respondents' answers providing scores for both interest and influence for each identified stakeholder. The categories on the grid ranged from low (0-1),

medium (1-2) to high (2-3). A mark of zero represented no interest and/or influence whereas three represented high influence and/or interest. For further specificity between stakeholders, the ranks were taken as decimals. For example land managers may be classified as high interest e.g. 2.5 but low influence e.g. 0.50 and these scores were entered into a database. The means for the overall observations, for interest and influence per stakeholder, were calculated and displayed in scatter plots (Figures 2 -5) according to the stakeholder category groupings.

The score data on interest and influence were analysed separately using a Kruskall Wallis (KW) test. This was used to identify whether the shared attributes of respondents influenced their perception of other stakeholders. The KW test was appropriate as it deals with non-parametric datasets; ranked data alongside nominal data (McKight and Najab, 2010). KW compares between the medians of two or more sample groups to determine if the samples have come from different populations, and produces a chi-squared probability (McKight and Najab 2010). This test is sensitive to sample size, and if considered 'too small' (e.g. < 5) a chi-square probability cannot be produced (McKight and Najab, 2010). Statistical data analysis was undertaken with Genstat (15.1.0.8821).

4. Results

4.1 Stakeholder identification and networks

The respondents confirmed and identified 27 RP scheme stakeholders (individuals and groups), each with a varying number of observations, as shown in Figure 13. The number of observations ranged from 55 (for the majority of regional government stakeholders) to the lowest number of 6 for the Advisory group, Historic Scotland. These findings are based on the respondents understanding of the RP context (Hesse-Biber and Leavy, 2011), and so the number of observations reflect the strength of the network links between the identified stakeholders and the institutional respondents. For example, the institutional stakeholder group consists of definitive job roles, as opposed to the more generalised identified stakeholder groups; reflecting respondents familiarity of roles within government.

The identified RP scheme stakeholders and their policy networks are also illustrated in Figure 13, indicating both formal direct links and informal links (which indicate lobbying capacities) between each of the stakeholders. The network diagram is based on amalgamated perceptions, which is likely to be indicative of a respondent's role within government and more specific respondent attributes.

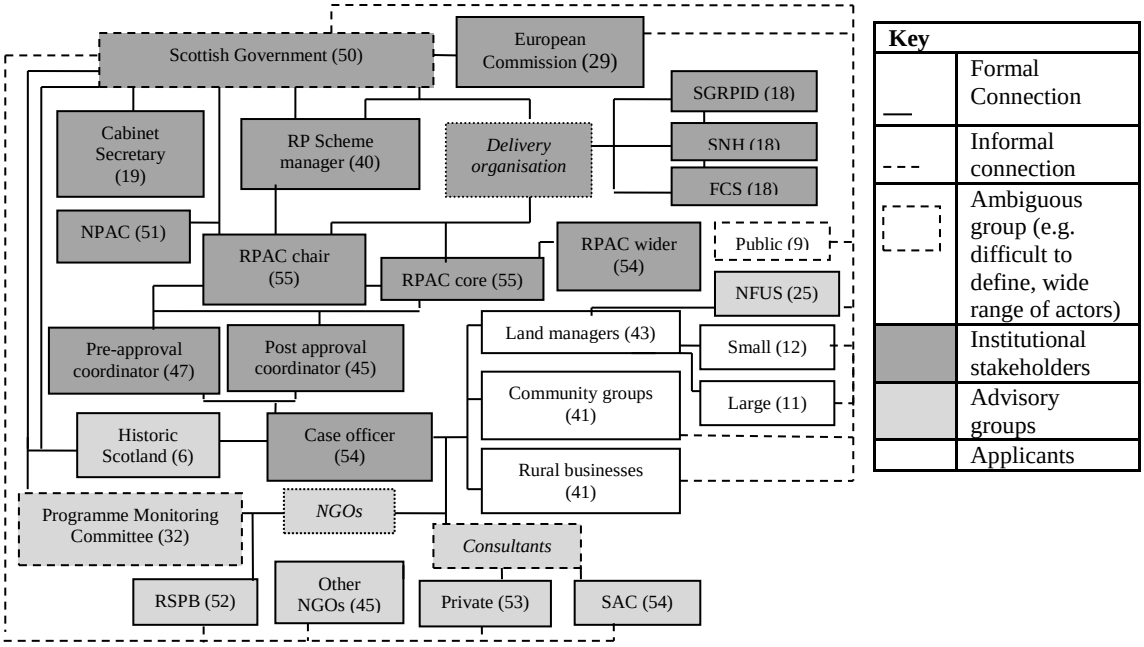

Fig.13. Identified SRDP RP scheme stakeholder network diagram and number of observations

4.1.1 Description of RP scheme stakeholder network

The following section provides further detail on the connections and roles between identified stakeholders and their links with government within the RP scheme network (Figure 13) as acknowledged through the qualitative interviews.

Respondents with Scottish Government roles; for example the Cabinet Secretary and RP scheme manager, commonly being those within Central Government were considered as part of a single cohesive system. Scottish Government was also noted for having the highest number of informal and indirect links with all the other stakeholders identified. Furthermore, they were the only stakeholder group perceived to have direct formal links with the European Commission.

The RPACs representing the regional government, contain five members, each from public bodies, and interact during infrequent proposal assessment and approval meetings. RPAC chairs and core members were acknowledged for having major roles in managing scheme delivery in their regions, whereas the RPAC wider members were perceived to have limited involvement apart from the RPAC meetings. Additionally, a select number of RPAC chairs form the NPACs (responsible for setting RPAC budgets and scores) and have additional formal links with Scottish Government.

The interaction between the RPAC members (core and chair) with case officers was perceived to vary across regions, but the main consistent link is via the ‘pre and post approval’ coordinators. Both coordinator roles involve bridging concerns and

queries between the RPACs and the case officers in order to enhance consistency in application assessments.

The main job role of the case officer's was described as processing applications and communicating with those who submitted the proposal (either directly with the applicant or via consultants). Case officers were also reported to network with case officers from the other delivery organisations for advice exchange. Additionally, case officers networked with outside NGOs and had limited links with other public agencies (e.g. Historic Scotland) for advice exchange and to gain project consent.

Consultants were identified as major players in developing proposals, with respondents commonly estimating that 90% of applications were completed by consultants. Their main link was with applicants who would hire them to develop and submit applications on their behalf. A few respondents perceived all applicant types to have an informal lobbying link to Scottish Government as members of the 'general public', whilst more specifically farm businesses categorised as land managers were also perceived to have stronger links to Scottish Government through association with the National Farmers Union of Scotland (NFUS).

NGOs involved with the RP scheme primarily focus on habitat and species conservation, and have varying links with applicants by providing free advice and support in promoting environmental options such as Butterfly Conservation, and the Bumblebee Conservation Trust. Respondents acknowledged the RSPB as having the most prominent scheme involvement with the strongest links of any NGO with Scottish Government. However a number of NGOs also have more formal links to Scottish Government as representatives of the Programme Monitoring Committee, a decision-making group that brings together stakeholder organisations and members of central government for SRDP monitoring (Scottish Government, 2012d).

4.2 Kruskall Wallis test results

The KW test identified if the shared attributes of respondents influenced their perceptions of certain stakeholders by scoring data on interest and influence. Overall the KW test produced significant results for job roles and organisations only, with no significant results for RPAC regions. Non-significant results could indicate coherence of opinion across attribute groups; however, as chi-squared probabilities for regions could not be produced these results are more likely indications of insufficient sample sizes. Small group sizes were due to limited capacity and the willingness of potential respondents with appropriate attributes to participate. Furthermore, a low number of

observations for identified stakeholders also resulted in insufficient group sizes (for example 'the public' had nine observations).

The two significant results for job role (categorised as case officers, coordinators, RPAC members and Scottish Government) (please see Appendix D Table 1). For 'interest' the 'RPAC core members' revealed a significant difference between perceptions for these four groups with a P value of 0.03. The results illustrate that case officers perceived 'RPAC core members' to have lower interest compared to the other job role groups. For 'influence' 'rural businesses' also had a significant difference in the medians between job groups with a P value of 0.05. Coordinators and case officers both similarly perceived rural businesses to have an overall lower influence compared to the responses from the other job role groups.

Representative responses were sufficient for the attribute 'organisation' despite numbers varying across the organisation types (please see Appendix D Table 2). The KW produced significant results for both influence and interest. For 'influence' four stakeholders: NPAC, RPAC member core, RPAC member wider, and Scottish Government, had significant results. Each of these institutional stakeholders represents those working within or who are linked closely to Scottish Government. Results reveal the SGRPID organisation respondents perceived each of these significant stakeholders to have overall higher influence comparative to the other organisation groups.

Respondents' perceptions of interest between organisations revealed two significant differences for RPAC chair and the RSPB (the first significant non-institutional stakeholder). SGRPID respondents for instance perceived RPAC chairs to the have the most interest compared to the other groups, while those in Scottish Government perceived RPAC chairs to have the lowest interest.

4.3 Stakeholder power mapping

The results of the mapping exercise are displayed in scatter plots in Figures 14 – 17, illustrating the mean scores attributed for respondent perceptions of interest and influence in RP scheme outcomes, i.e. the number and type of options taken up in their RPAC area, per stakeholder observation. The findings demonstrate that the means of interest and influence varied in and between stakeholder groups, as did the standard deviations (SD) per observations indicating the extent of differing perceptions.

For institutional stakeholders, the means ranged according to overall respondent perceptions, yet the majority of institutional stakeholders were perceived to have a medium 'interest' in the scheme options and a medium to high 'influence' to promote

uptake of those options (see Figure 14). Post coordinators, involved with the RPAC regional administration of post approved RP contracts, were perceived to have the lowest interest (1.57) and influence interest (1.18) of the institutional stakeholders. The cabinet secretary, as a member of Scottish Government, takes a leading managerial role in the RP scheme and was perceived to have the highest interest (2.31) and influence (2.52). Variation in respondents' perceptions of institutional stakeholders was relatively consistent, with a SD of 0.70, with the exception of the European Commission which had the smallest variation for influence (0.26), indicating the majority of respondents perceived them to have high influence.

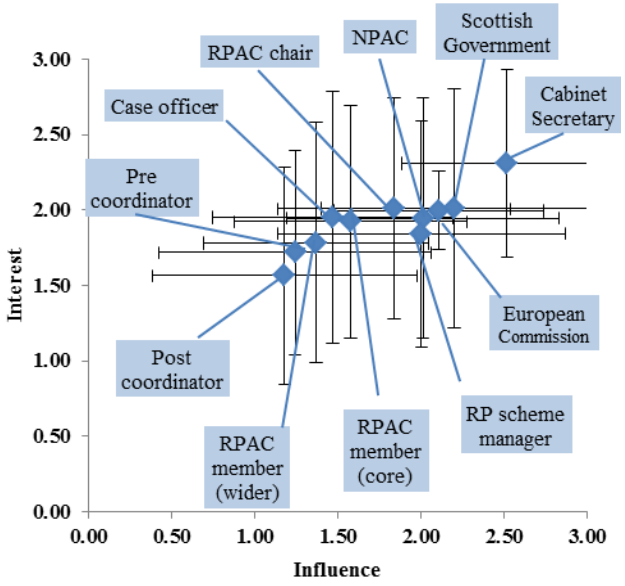

Fig.14. Stakeholder mapping; mean interest and influence of RP scheme institutional stakeholders, with error bars indicating standard deviation

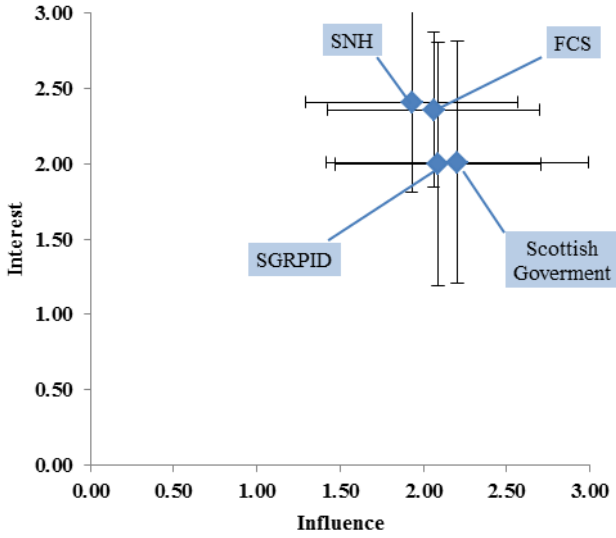

Fig.15. Stakeholder mapping; mean interest and influence of RP scheme delivery organisations, with error bars indicating the standard deviation

Perceptions for the different delivery organisations interest in and influence on the RP scheme outcomes indicated that each stakeholder has medium to high influence and high interest (seen Figure 15). Results indicate two distinct groups; with both SNH (2.41) and FCS (2.36) having markedly higher interest compared to SGRPID (2.00) and Central Scottish government (2.01). The variation of perceptions per organisation observation was relatively consistent, although for both SNH and FCS influence was reduced further relative to SGRPID and Scottish Government.

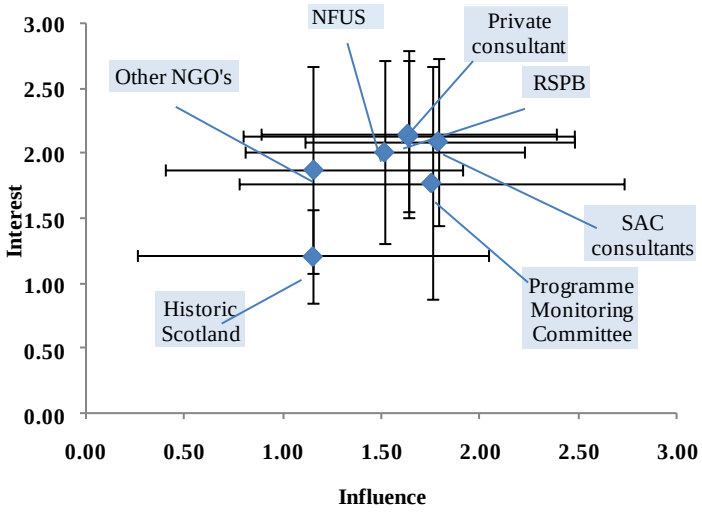

Fig.16. Stakeholder mapping; mean interest and influence of RP scheme advisory groups, with error bars indicating standard deviation

The advisory group means in Figure 16 are relatively similar with predominantly high interest and medium influence for these stakeholders. However, 'Historic Scotland' and other environmental NGOs' were both perceived to have comparatively lower interest and influence. SAC consultants were perceived to have the highest relative amount of influence amongst this group. There was a larger variation in the SD between advisory stakeholders with Historic Scotland and the Programme Monitoring Committee having the largest SD for influence, which could be explained in two ways. The large SD for Historic Scotland is probably due to the low number of observations (e.g. total of 6), as dispersion increases with smaller sample sizes (Rubin, 2013). Furthermore, the SD for the Programme Monitoring Committee was higher than average for influence at 0.98, probably because of the uncertainty of many respondents about the role of this committee, as indicated in the interviewees responses.

The applicant stakeholder group results, illustrated in Figure 17, apart from the general public, indicate similar levels of interest and influence. Land managers were perceived to have higher interest (2.21) and medium influence (1.30), but also had the highest comparative SD for both interest (0.82) and influence (0.84). This variation

between respondents' perceptions for land managers could arise from differences between the types of land manger. This was indicated by some respondents who chose to further define land managers as 'large' and 'small', with different levels of influence accordingly. For instance large land managers were described as having larger more intensive farms and estates and were perceived as having the highest relative influence (1.43) of the group. Conversely, small land managers, including crofters (often a relatively small agricultural tenant; Crofting Commission, 2013) were perceived as having the lowest influence (0.93) and interest (1.60).

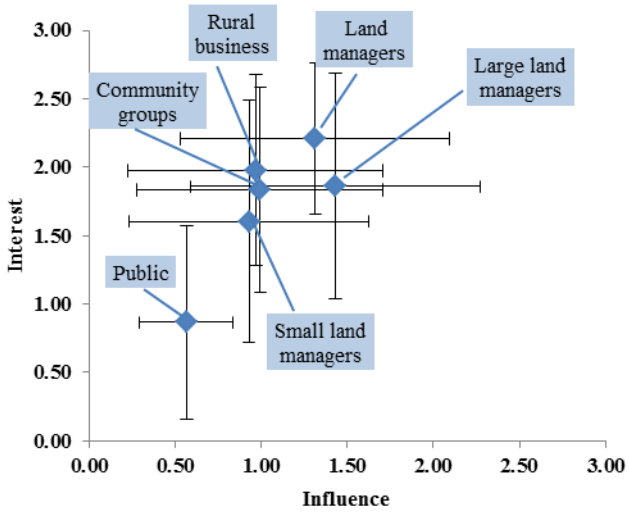

Fig.17. Stakeholder mapping; mean interest and influence of RP scheme applicants, with error bars indicating standard deviation

Rural businesses and community groups were perceived as having a similar level of influence (0.97 and 0.10 respectively), but with slightly higher interest (1.98 and 1.83 respectively). The 'public' was the only stakeholder across all of the observations perceived to have both low interest (0.87) and influence (0.57).

5. Discussion

A strong drive towards incorporating the 'principles of good governance' was evident in the formulation and structuring of the SRDP RP scheme (COM, 2001b; Scottish Government, 2008). However the results reported here highlight that, as Berger (2003) predicted, inevitable power imbalances have prevailed, with varying influence between stakeholders, which brings into question the effectiveness of these efforts. The following discussion is framed around Berger's (2003) five structures of governance, in order to assess how 'good governance' efforts have been implemented in practice.

5.1 Networks

Results from the interviews about the perceived RP scheme network revealed both the formal institutional and informal structural links between stakeholders. Respondents also provided examples of both the positive and negative aspects of network interactions within the scheme, and emphasised the importance of organisational networks. For instance respondents mostly perceived the collaboration of the three delivery organisations - FCS, SNH, and SGRPID - as positive for promoting co-operation and networks. Organisational collaboration often occurred in relation to applications between RPAC members, and also between case officers, benefiting from drawing on different areas of expertise from each of the differing organisations and across regions. However, despite overall 'improvements', results also suggest obstacles are perceived to remain in developing a more cohesive working relationships between the organisations.

For instance, evidence from this study supports the argument that different institutions and actors can exhibit uneven power distributions as a consequence of organisational cultures and consequently varying approaches to objective delivery (Berger, 2003). Uneven power distributions were demonstrated in the perceived differences of influence and interest between the three organisations demonstrated in the KW test and stakeholder mapping results. The KW tests indicated that there was a significant difference between organisations' perceptions about centralised stakeholders. Furthermore, the stakeholder mapping indicated that overall respondents perceived SNH and FCS to have relatively similar interest and influence, whilst SGRPID was perceived to have comparatively lower interest.

The importance of differing organisation cultures and approaches to objective delivery (Schultz, 1994) was evident in the results presented here; with FCS and SNH more alike compared to SGRPID. FCS and SNH differ in terms of specific targets and strategies, but have similar organisational goals for environmental outcomes (FCS 2012; SNH 2012). Both organisations were perceived to have higher interest in option implementation. Staff from SNH and FCS concurred that before the RP scheme they were capable of facilitating option uptake and stated the importance of advice for specific option uptake, yet with the current scheme their role has shifted to become more administrative and process focused. Yet both SNH and FCS staff argued that targeted advice and assistance were still required to achieve co-ordinated policy objectives. Moreover avoiding the situation in which applications were repeatedly submitted and rejected due to lack of feedback and advice. Consequently FCS and SNH

respondents commented on the disempowerment of case officers in this newer role, believing their influence had decreased since RP scheme implementation.

Alternatively, SGRPID were identified as having lower interest in scheme outcomes relative to the other organisations, but to have higher influence. Organisational power imbalances were perceived to be a consequence of SGRPID's influential role as the single EU paying agency and regulatory body, as well as the size of their work force, and their position within central government. For instance, SGRPID was perceived to have more influence as "*they're almost on a par with senior management within Scottish Government"* (Scottish Government interviewee). SGRPID works as an administrative regulatory body with emphasis on the applicant's ability to meet checks and criteria as opposed to advice. Consequently respondents perceive, as with Scottish Government, that SGRPID are procedure driven as opposed to outcome driven.

These results indicate some of the underlying differences between the three organisations, despite the policy drive for consistency across the three organisations. In spite of network improvements, a number of respondents indicated that differences in organisational preferences, between advice and regulations, and emphasis on outcomes or process, were both an obstacle to scheme efficiency. These differences and conflicts are potentially exacerbated by perceived power imbalances between the organisations.

5.2 Inclusion of wider parts of society

In line with the European Commission's good governance principle and the second of Berger's (2003) governance structures, inclusion of wider parts of society, were also identified in the RP scheme design. The RDP was originally aimed at farm holdings, but under the new RP scheme applicant eligibility types have been widened so that rural businesses and community groups may also now compete for funding. Findings from both the interviews and stakeholder mapping exercise however indicate that barriers remain for 'wider' applicant involvement. This is indicated in Scottish Government data (2007-2011) for the RP scheme, with 500 rural business contracts issued compared to 15,000 contracts for farm holdings. Furthermore, land managers, particularly 'large' land managers were perceived by the majority of respondents to have the highest levels of influence. Case officers suggested this was due to the ability of larger land managers, including estates, to match funds and adopt a wider range of policy measures. In contrast, 'smaller' land managers, such as crofters, rural businesses and community groups were at a disadvantage due to limited land, access to advice and finance, and

were therefore considered to have relatively lower influence. Furthermore the RP scheme option and eligibility criteria are also considered a constraint for the ability of smaller land managers to compete for funding; as one respondent said, whilst *"their interest is high, they are wanting to use SRDP but they can't. It's too complicated or they can't get enough to score"* (FCS, case officer).

It was recognised by the majority of respondents that certain types of applicants have been better able to win a scheme contract than others, such as large land managers; and consequently they have a higher influence. For community groups these issues have been partly resolved by deferring cases to LEADER, which is a local action group that assesses RDP applications which contribute wider community benefits (Scottish Government, 2008). However, lack of finance and access to advice for smaller land mangers and rural businesses persist as obstacles to wider scheme adoption (COM, 2001b).

5.3 New public management

New public management (NPM) is a way in which governance can be linked to efficiency and effectiveness of the market economy, providing incentive structures for public service provision (Rhodes, 1996 and 1997; Berger, 2003). NPM is apparent in the RP scheme as a competitive mechanism, with applicant proposals evaluated in terms of offering the best value for money. The majority of the respondents accepted this and understood that public funds require justification and therefore the need within the scheme scoring mechanism to select proposals on the basis of quality. However, the interview findings suggested that the design of the current scoring mechanism did not always guarantee quality, with almost half of the respondents sharing the opinion that even when an application scores well *"that doesn't necessarily mean its good"* (FCS, coordinator).

Respondents indicated that consultants could often navigate the scoring system and knew the formula, despite questionable suitability for a high scoring proposal. For instance, consultant led proposals were reported to be "*not necessarily reflecting what is right for that business or right agri-environmentally on the land*" (SGRPID, Case officer). Therefore consultants were perceived to have a relatively higher influence compared to the majority of stakeholders including applicants and case officers, although this was often seen as a shortcoming of the scheme. Respondents suggested that because of this, applicants were likely to become disengaged from the scheme, and that case officers were unable to rectify this situation because of constraints on the

advice they could provide. The scoring mechanism was also perceived to occasionally fail some applicants, in spite of the suitability and potential environmental benefits of their applications, due to an inability to meet the scoring thresholds. The rejection of potentially suitable proposals due to low scores was recognised as a consequence of having one uniformed scoring criterion for a huge variation in project types. As one SGPRID coordinator said: "*you're going from play parks, to milking parlours, to butterflies, [and] you have one scoring sheet that covers everything"*. However most respondents assumed that this could be rectified by having a *"separate scoring system for the different [objectives]…[which] would allow them to target the scoring more to the priorities that were coming in"* (Coordinator, SGRPID).

The requirement of an NPM approach was accepted but criticised. The inability of the schemes scoring system to differentiate quality among diverse applications was perceived to be the biggest issue, with respondents recommending that a more tailored scoring system to particular objectives would go some way to promoting better targeting. Furthermore, imbalances of influence between consultants and institutional stakeholders in driving option uptake may need to be addressed; in as much as the role of consultants affects the ability of government to coordinate option uptake in order to meet regional and national priorities.

5.4 Multilevel government involvement

Multilevel governance is clear in the RP scheme, with EU, Scottish Government and RPAC involvement. The introduction of the RPACs as a regional decision making body represented a move towards decentralisation adhering to the principle of subsidiarity. However, the interviews and the stakeholder mapping exercises showed that the influence of the RPACs was limited because of a lack of decision-making capabilities arising from the inadequate transfer of power and resources from central government.

RPACs, for instance, were tasked with formulating their own regional priorities, which was seen as a potential tool for enhancing regional stakeholder influence and participation in all regions. In practice, however, regional prioritisation was reported as a 'non-process' by the majority of respondents, as priorities were demonstrated to be "*pretty standard across all the regions"* (SGRPID, case officer). Regional priorities were argued to be uniform as a consequence of regions competing for a national pot of money. Respondents felt that there was "*tendency of some of the RPACs to say any money coming into our region is a good thing"* (SGRPID, RPAC member). It was therefore often suggested that regional budgets are required in order to improve the

ability of RPACs to prioritise effectively, and this would also enhance accountability. For instance *"if you had a regional budget you then have to decide on…we have to get the best for our region"* (SGRPID, RPAC Member). However, others argued that the complexity of allocating regional budgets would introduce its own set of problems and that "*administratively it'd be a nightmare"*. (SGRPID, RPAC member) with the possibility that it would *"cause more infighting between areas"* (SGRPID case officer). Yet, despite concerns, local budget allocations have been demonstrated to work successfully. For instance, the SRDP LEADER scheme already allocates variable budgets to over 20 local action groups who then determine what projects to fund (Scottish Government, 2008).

RPAC members also perceived their ability to prioritise and make decisions to be hindered by the sheer number of applications and strict scoring procedures. One RPAC chair commented that: *"It all depends how the [scoring] cut off has been set and whether there is a buffer … if it's in the buffer you can approve it".* As a result, RPAC members commonly felt that their expertise was being underutilised in the scheme. In response, a common recommendation was that RPAC meetings should only address atypical or high spends projects, standard applications being checked by the coordinators, thus allowing further time and effort for specific application reviews.

The ability for regionalised government to make effective decisions is hindered by financial resource allocation and the rigid scoring system set and managed by central government. Regional budgets are thought to provide the means for RPACs to effectively prioritise their own needs, providing an incentive to narrow down the options. Furthermore, decision making capabilities could be enhanced by creating flexibility in the scoring system and prioritising specific cases for RPAC approval. Whether or not these recommendations are suitable in practice, the issues identified under multilevel governance structures by respondents highlight some of the core weaknesses of the RP scheme. This area of research would benefit from further exploration due to the importance of this governance structure and its implications in the schemes ability to meet initial decentralised policy objectives.

5.5 Hierarchies

The findings of this research indicate that hierarchies, and the legislative and executive decisions from the higher tiers of government (Berger's (2003), were perceived to influence both RP scheme formulation and implementation (Sharpf, 1997; Hèritier and Lehmkuhl, 2008). Both central Scottish Government (including those in recognised

centralised job roles) and the European Commission were perceived to have similarly high overall influence compared to all other stakeholders, indicating that the RP scheme is largely dominated by a centralised tiered hierarchy. However, while this influence was removed from the sharp end of scheme implementation, the power of the European Commission and Scottish Government was argued to reside indirectly through scheme amendments and the monitoring and auditing process.

Within Scottish Government, the Cabinet Secretary, a politician in government tasked with overseeing the RP scheme, was perceived by the majority of respondents to have the highest influence, with the ability to promote specific options indirectly. The Cabinet Secretary was seen as the figurehead of central government with the authority and ability to amend the scheme, in terms of objectives, procedures and budget. Respondents identified an example of this influence with the success of national targets in the RP scheme; for example, driving the uptake of woodland expansion options linked to climate change mitigation as part of the central government's policy to reduce greenhouse gas emissions at least by 42 % by 2020 (SNP, 2011)

However, the interviews showed that the ultimate power in influencing the scheme was still perceived to be the European Commission, which was acknowledged as having final authority over scheme implementation, amendments, budgets, but moreover the ability to wield the threat of penalisation (Scottish Government, 2007). Through audits directed by the European Commission, the scheme is under constant scrutiny, which could result in a national disallowance and this was stated by respondents as a primary critique of the scheme (Scottish Government, 2007).

This relates to the discourse on the conflict between the scheme as being outcome or process led: the scheme is promoted as an 'outcome oriented approach' in policy documents, yet in practice respondents perceived it to be 'process led' as a consequence of the emphasis on checks and audits directed by Scottish Government to satisfy the demands of the European Commission (Scottish Government, 2008; Scottish Government, 2010a). Respondents understood the necessity of audits for accountability and consistency, but felt the balance in resources was misplaced. For example, undue resources in both personnel and paperwork were perceived to be allocated to bureaucratic audit checks, as opposed to focusing on outcomes. As one respondent argued, the scheme is:

"not delivering nothing, but it's delivering far less than it should or it could, and a lot of that is down to what's lost in continually having everything verified, validated, revalidated and checked, and the penalties that everybody's so scared of" (SNH, case officer).

Thus, hierarchies linked with multilevel governance structures are hugely influential in scheme outcomes; with these two tiers of European and Scottish Government, RP policy outcomes are perceived to be driven indirectly by the domination of policy process design and procedural enforcements and checks. This influence is perceived positively with the ability to drive specific options such as national targets, but also negatively with burgeoning bureaucratic complexities. However whilst essential for accountability, respondents proposed that simplifying and streamlining the procedures for applications and assessment, would be desirable by improving transparency of the auditing process. Furthermore, respondents argued that if outcomes were prioritised in practice, then the majority of resources would be further directed to monitoring and evaluating what the scheme was achieving in practice.

6. Conclusion

This chapter examined the implications of power relationships within governance structures and assessed whether good governance principles were achieved in the RDP RP scheme in Scotland. Whilst the principles of 'good governance' - openness, participation, accountability, effectiveness and coherence - outlined by the European Commission (COM, 2001b), were incorporated into the RP scheme design they were not applied equally. Trade-offs were identified between the principles, which highlighted the difficulty of achieving good governance in practice.

Overall the RP scheme has taken a centralised approach emphasising the good governance principles of 'accountability' and 'coherence'. However, this may come at the expense of policy 'effectiveness' (COM, 2001b). For both decentralised and centralised decision making approaches, tradeoffs are inevitable (Bovaird, 2005; Mann and Gennaio, 2010). Both 'accountability' and 'coherence' are used to justify the rigid controls for RDP implementation between the European Commission, the Scottish Government and the RPACs. However, such controls have negative effects on the behaviour of institutional stakeholders and applicants because of the complexity and fear of inspections (Héritier and Lehmkuhl, 2008). Furthermore, the focus has been diverted from achieving effective targeting and policy outcomes by diverting resources into ensuring policy process regulation and control.

The imbalances between stakeholder influence and interest were also perceived to impact scheme outcomes. Respondent job roles and organisation affiliations influenced stakeholder perceptions, highlighting the underlying differences and possible areas of conflict in spite of the policy drive for consistency. Furthermore, stakeholder

mapping was able to distinguish between similarities and differences in the opportunities and barriers for cohesive network relationships as well as wider applicant participation. These distinctions can support future policy decisions about whether a participative policy process is needed with parity in power between individual stakeholders (Sidaway, 2005).

Berger (2003) suggests the need for formal decision making structures and clearly defined rules between levels of government and stakeholders.. Otherwise, policy risks becoming informal and non-transparent, and getting the right balance for the RP scheme has proven difficult. Whilst the RP policy aims to take advantage of the benefits of both a centralised and decentralised approach, it has compromised the ability for localised decision making. Thus stronger initiatives are needed in terms of resource and power distribution at all stages of the policy chain if decision makers truly want to embrace a decentralised approach in practice. If decentralisation is the chosen strategy in rural development then involvement of wider stakeholders needs to go beyond consultation and towards actual partnership between all levels of government.

Chapter 4:

An assessment of multilevel governance, and the implications on environmental targeting

1. Chapter overview

This chapter leads on from the previous chapter to go further in-depth into a single prominent governance structure of Scotland's RDP Rural priorities scheme. Focussing on purely the qualitative interview findings with institutional stakeholders, an assessment of the application of multilevel governance and decentralisation has been made. This chapter therefore firstly discusses the concept of multilevel governance and the relationship between centralised and decentralised decision making and policy effectiveness. Secondly, it examines how EU RDP – and subsequently Scotland's RP scheme – has incorporated aspects of a more inclusive governance approach to enhance environmental targeting into its policy design then reports on results from a qualitative methodology used to assess these efforts .

2. Introduction

Effective environmental targeting of rural policy has never been more necessary. Increasing pressures on natural resources in parallel with an uncertain economic climate means policy efficiency to achieve 'best value for money' is paramount (Hodge, 2012). In order to meet changing rural priorities in the European Union (EU), the Common Agricultural Policy (CAP) has undergone numerous reforms since it was created in 1957. As a core mechanism for agricultural and rural support, the CAP has increasingly prioritised wider environmental, economic, and social objectives across the EU, driven by the formation of the Rural Development Policy (RDP). The RDP 2007-2013 includes a set of policy measures with objectives which focus on land management actions that improve the environment and countryside (COM, 2006c).

Alongside these changes to the CAP, EU policy in the last decade has also emphasised 'improved governance', particularly through more inclusive participatory multilevel government systems (COM, 2001; 2009a; Chapter 3). The European Commission's White Paper on multilevel governance published in 2009, promotes participation, collaboration, and coordinated action of the EU Member States and

regional authorities in policy design and implementation (COM, 2001; 2009a). Following criticism of more traditional centralised EU policy making, a multilevel approach is intended to make for better 'differentiation and specialisation' in policy implementation, creating adaptive policy that is suited to the diversity of territorial needs across Member States (COM, 2009d, p.18).

Policy-makers have attempted to incorporate both principles of multi-level governance and environmental objectives into Scotland's RDP, through the Rural Priorities (RP) scheme (Scottish Government, 2008). The policy design of the RP scheme emphasises a strong regional approach, along with national and regional targets to support environmentally beneficial land management (Scottish Government, 2008). This includes the introduction of eleven regional decision making bodies known as RPACs (Regional Project Assessment Committees); which have been tasked with selecting 'regional priorities' to target the needs of their areas (Scottish Government, 2008).

However, as the current RDP period draws to a close in 2013, the effectiveness of the RP scheme to promote regionalised governance and its impact on environmental targeting has yet to be explored, in-depth, and doing so is a key aim of the research presented here. In this chapter the concept of multilevel governance and the relationship between centralised and decentralised decision making and policy effectiveness are discussed. To examine how EU RDP – and subsequently Scotland's RP scheme – the chapter has incorporated aspects of a more inclusive governance approach to enhance environmental targeting into its policy design. The chapter also presents results from a qualitative methodology used to assess these efforts. In doing so, the chapter explores the following three questions: 1) How have environmental targeting and multilevel governance been incorporated into RDP design? 2) How effective have these efforts been in practice? 3) What recommendations can be made, if any, to better improve targeting at a regional level?

2.1 Multilevel governance and participation

The concept of governance has become important to both describe and develop strategies for policy making (Berger, 2003). Governance in European policy making was defined as "*the means, rules, processes and behaviour that affect the way in which powers are exercised at European level particularly as regards openness, participation, accountability, effectiveness and coherence"* (COM, 2001, p.8). Recognising the need to apply a more inclusive approach to policy in response to criticism of a top-down

centralised policy approach, the European Commission has promoted wider participation (COM, 2001).

The emphasis on wider participation has been further supported in EU policy, with the promotion of 'multilevel governance' (COM, 2009d). Multilevel governance refers to the coordination of EU policy development and implementation between the European Commission, Member States and regional authorities (COM, 2009d). Furthermore, the implementation of multilevel governance depends, and should be cohesive with, the principle of subsidiarity (COM, 2009d). Subsidiarity refers to decision-making made at the most appropriate level of government (COM, 2013c). Member States are predominately responsible for determining what is appropriate decision making, and whether to take a centralised or more decentralised strategy in administering specific policies (Beckmann et al., 2009). Central governments must decide therefore on the extent of the autonomy needed to plan, finance, and administer policy at a regional level depending on policy structuring and resource provision (Grocnctulijkll, 1998; De Sadeleer, 2012). How such resources are allocated will arguably be a strong indicator of the extent of decentralisation, and will likely influence policy outcomes as a consequence (Bennett, 1980; Grocnctulijk, 1998).

For example, a decentralised approach may arguably be less efficient than a centralised system (Bovaird, 2005). Decentralisation is linked with capacity building, inclusion and wider participation and may consequently lead to increases in financial costs and delays in decision making (Bovaird, 2005). Such costs can be referred to as 'transaction costs' associated with the expenditure in designing, implementing and enforcing contractual arrangements (Beckmann et al., 2009). The same efficiency issues are associated with multilevel governance systems due to increased complexity and interaction among a range of actors (Tsebelis, 1995; Paavola et al., 2009). Furthermore, accountability may consequently become fragmented in multilevel systems (Peters and Pierre, 2004; Boviard, 2005). Berger (2003) argued that these issues can be accounted for by careful policy management and through formalised decision-making structures with clearly defined rules for each level of government. However despite potential efficiency losses with respect to process, for environmental policy, decentralised, participatory governance approaches are assumed to achieve more effective outcomes (Yearley et al., 2003; Pellizzoni, 2003; Newig, 2007; Dietz and Stern, 2008; Newig and Fritsch, 2009). It is argued that more 'appropriate' decisions can be made by the localised authorities who better understand the needs and processes at that scale level (Beckmann et al., 2009; Mann and Gennaio, 2010). Additionally, effectiveness would

be enhanced since a more localised, inclusive approach to decision making is expected to contribute to higher levels of acceptance and implementation rates (Sabatier et al., 2005).

In contrast others argue that collective matters are better dealt with by a national centralised system rather than at the local level (Dahl, 1994), especially for trans-boundary environmental issues with implications across local, regional and international borders (Falleth and Hovik, 2009; COM, 2009d). Forestry, for example, has wider trans-boundary environmental implications for carbon sequestration and the mitigation of climate change and hence implications go beyond those of the local region (Scottish Government, 2008; Falleth and Hovik, 2009; COM, 2009d;). Under the 'collective-action dilemma' it is assumed that the cost of taking environmental action is greater than the benefits gained locally (Hardin, 1968; Olson, 1969). Locals may be less in favour of local environmental action and more predisposed to prioritising economic considerations (Demmke, 1997).

In summary, the number of costs and benefits associated with decentralisation supports the rationale for adopting a multilevel governance approach. A multilevel system is considered a *"conducive mediation between centralised and decentralised decision-making"* (Newig and Fritsch, 2009, p.202). This mediation is indicated in EU policy with the joint goals of both encouraging 'participation' and reinforcing 'efficiency' through community action (COM, 2009d). Participation would likely be encouraged through decentralisation, whilst policy efficiency would be steered by European and central governments. However, how multilevel governance is administered in practice is indicative of how differences between centralised and decentralised systems have been, if at all, reconciled (Bovaird, 2005).

2.2 Rural Development Policy (RDP)

RDP as a component of the CAP is a policy area in which the European Commission actively encourages more inclusive governance, following the principle of subsidiarity. Consequently RDP's are encouraged to be as decentralised as possible (COM, 1999b). In addition a decentralised approach is seen to be cohesive with improved environmental targeting. Spatial differentiation in the targeting mechanism achieved through input from regional experts assists targeting by applying more informed decision making to local needs (Wünscher et al., 2008; Finn et al., 2009; Chapter 2 &3).

The European Commission RDP guidelines recommend targeting EU priorities at the most appropriate geographical level in addressing climate change, enhancing

biodiversity and water quality, or reducing the risk or impact of natural disasters (COM, 1999b). Furthermore, the highest mandatory budget allocations are associated with 'improvement of the environment and countryside' reflecting again the EU's drive to have RDP as a prominent policy for environmental enhancement (COM, 2008a). The RDP environmental objective is the second of four compulsory objectives, known as Axes, incorporated into RDP's for the period 2007- 2013 (COM, 2008a). How specific environmental areas are targeted in practice is at the discretion of the Member States.

The RDP objectives, for instance, can be prioritised through budgetary allocations proposed by Member States according to their needs, requiring them to match their targeting needs and estimate the number of applicants. Member State proposed budgets require final approval from the European Commission who decide overall central budgets and require Member States to justify through their RDP plan the 'Axes objectives' and associated measures for which they require funds (COM, 2008a). In addition, Axes are linked to policy measures that, whilst determined by the European Commission, can be selected by Member States. Apart from 'agri-environmental payments' (AEP), a single mandatory measure outlined by the European Commission as having a crucial role in protecting and enhancing public goods (COM, 2012b), measure selection is flexible. Member States can further refine measures by the use of 'options' to provide financial incentives that encourage land managers to participate in specific environmentally beneficial activities (COM, 2008a). Options should link the measure to the Axes, and indicate how the broader EU strategic objectives intend to be met (COM, 2008a).

Since RDP implementation post 2007, Member States are also obligated under EU guidelines to assess progress in meeting national and EU objectives by consistent RDP monitoring and evaluation (COM, 2008a). Member States are also subject to auditing to ensure the consistency, accuracy and legality of their RDP systems as if any element of the RDP is in breach of the RDP EU rules then financial penalties can apply (COM, 2011a). However, such *'complex financial accountability processes'* have been argued to cause considerable burden to the administration of the RDPs (Lockwood et al., 2004, p.176). Consequently applicants may become disenfranchised further limiting the capacity to deliver policy outcomes (Lockwood et al., 2004). Yet such tradeoffs are even more necessary in decentralised systems to compensate for fragmented accountability (Boviard, 2005).

In summary, the European Commission has broadly attempted to delegate decisions to the 'appropriate' administrative level by allowing Member States to

formulate their own RDPs. However RDP design is still guided by EU policy recommendations, and bounded by mandatory policy requirements related to objectives, measures, budgets, monitoring and evaluation. Individual Member States incorporate these aspects with their own varying environmental priorities (Beckmann et al., 2009). To better understand the implications of this EU strategy and the implications for opting for a more decentralised approach, Scotland's RDP is explored as a case study.

2.3 Case study: Scotland

The Scottish Government's RDP for 2007-2013 incorporates mandatory as well as recommended policy actions promoted by the European Commission. This is evident in the design of Scotland's RDP Rural Priorities (RP) scheme. The scheme incorporates a strong environmental focus, evident in its budgetary and targeting strategies as well as a multilevel governance design by regionalising administration and promoting a decentralised participatory policy approach to RDP delivery (Scottish Government, 2008).

Regionalisation is evident in the new RP scheme with the introduction of the RPACs. This involved the division of eleven regions of Scotland, each with designated representative decision making committees to develop regional priorities and assess individual funding proposals (Scottish Government, 2008). The introduction of the RPACs demonstrated an aim by the Scottish Government to reinforce institutional representation and influence (COM, 2009d). This included the partnering of three major governmental organisations; Forestry Commission Scotland (FCS), Scottish Natural Heritage (SNH) and the Scottish Government Rural Payments and Inspections Directorate (SGRPID), tasked with scheme delivery (Scottish Government, 2008).

These three organisations were chosen in order to more effectively deliver the integrated RDP's economic, social and environmental objectives (Scottish Government, 2008). Each of these organisations has multiple case officers tasked with administrating the scheme according to their expertise and designated RPAC regions. Furthermore, the regional committees have a senior representative from each of the organisations along with additional members from other relevant public bodies.

The RPAC is responsible for judging proposals during periodic assessment rounds to assess their eligibility for funding (Scottish Government, 2012d). Eligibility is assessed as part of a 'competitive process' established to encourage funding for projects that offer the 'best value for money' and meet both national and regional priorities

according to centrally devised scoring criteria, scoring thresholds and budgetary allocations (Scottish Government, 2008).

'Regional priorities' as a component of the scoring criteria are based on national priorities as outlined by central Scottish Government, many of which are environmentally focussed and relate to biodiversity, soil and water quality, and climate change (Scottish Government, 2008). Prior to the RP scheme implementation, RPACs were required to develop priorities with aspects of habitat and biodiversity suitable for their region (Scottish Government, 2008). Land managers able to meet these priorities can enhance their eligibility to compete for funding (Scottish Government, 2008). Furthermore, the funding scores that applicants receive are influenced by their ability to meet 'national targets', another component of the scoring system (Scottish Government, 2011e). Six of the seven national targets focus primarily on environmental objectives. For example, bringing into or maintaining in a favourable condition Scotland's nationally important nature sites, (such as Sites of Special Scientific Interest), and expanding woodland to mitigate climate change, are both national targets (Scottish Government, 2011e).

Scoring thresholds are further determined by the Scottish Government, which periodically amends the scores required by applicants to successfully receive funding for each RPAC round. This can be modified according to the availability of Axes and measure funding, in accordance with application numbers (Scottish Government, 2011e). The AEP measure for example has the highest total committed budget at £158 million and 77% of the total number of RP contracts (15,322) between 2008 and 2011 compared to the other RP scheme measures (Scottish Government data; 2008-2011). Therefore, as the scheme progresses, funding availability is reduced so the scoring thresholds are assumed to increase.

In summary, the multi-level targeting and environmental targeting can be observed at a European, national, and regional level, in Scotland's RDP RP scheme, as summarised in Table 6. At a European level, environmental targeting is indicated through the environmental minimum funding and compulsory AEP adoption. This is in parallel to the EU-wide promotion of decentralised, participatory policy making, providing flexibility to Member States to enable them to pursue their own policy preferences. The Scottish Government has consequently employed these recommendations into their RDP design, primarily with the introduction of the RPACs, budget allocations, and scoring criteria including both national and regional priorities. These actions indicate a strong centralised drive to promote environmental RDP

outcomes through a regionalised approach. This chapter explores the success of these efforts by examining the Scottish RDP RP scheme 2007-2013.

Table 6. Summary of multilevel government mechanisms for environmental targeting and decentralisation strategies for the SRDP RP scheme policy 2007- 2013

Government Level	Policy Mechanisms	Environmental targeting	Decentralisation strategies
EU level: European Commission	Axes objectives, RDP regulations, minimum EU budget requirements	Axes 2 'environment' objective: compulsory AEP measure	Broad recommendations; Flexibility; LEADER approach.
National level: Scottish Government	Policy design, authorisation, allocated budgets	National targets Broad regional priorities Design policy options Scoring thresholds	Introduction of RPACs; Partnership of delivery organisations (FCS, SNH, and SGRPID)
Regional level: RPACs	Regional priorities, assess and authorise applications	Regional priorities, RPAC application assessment rounds	Consultation of wider stakeholders; RPAC meetings

3. Methods

Semi-structured interviews were undertaken with key central and regional institutional stakeholders in order to assess the effectiveness of Scotland's multilevel, RDP governance approach in targeting environmental issues. The interview method is described in more detail in Chapter 3. These interviews were also used to examine the role of the RPACs in parallel to an assessment of decision-making capabilities at the EU, central and regional, governmental levels. Semi-structured pilot interviews were conducted with eleven RP scheme policy experts (including institutional staff, RDP researchers, NGO staff and land managers). This assisted in identifying key stakeholders, as well as developing questions for the second stage of the interview approach.

A semi-structured approach was adopted to allow respondents to explore issues that they feel are the most important (Kitchin and Tate, 2000; Longhurst, 2010). Respondents in regional offices were recruited through email contact, which included an interview information sheet and covering letter. A snowball technique otherwise known as 'chain referral sampling' was also used, whereby respondents were asked to suggest further interviewees. Both confidentiality and anonymity were ensured throughout the research design, and respondents' permission sought regarding the recording of interviews, storage of data and attribution of results (Longhurst, 2010).

Second stage interviews were conducted with institutional stakeholders involved in central and regional Scottish Government. These primarily included personnel tasked

with the delivery of the RP scheme and included representatives from: Scottish Government involved in centrally-managed policy decisions; RPAC chairs and members; coordinators who assist in managing application and advising case officers; and case officers tasked with assessing and scoring applications ready for the RPAC rounds. Respondents were selected as a representative sample across core job roles, from each delivery organisation (FCS, SNH and SGRPID) and across the RPAC regions. In total, 61 second stage interviews were conducted between August 2011 and March 2012. The narratives from each interview were fully transcribed and these transcripts were managed, coded and analysed with Nvivo9 (Version: 9.1.106.0).

4. Results

The following results represent respondents' opinions on the strengths and weaknesses of the RP scheme, with specific reference to perceptions of the roles of the EU, central and regional government, and influences on decentralisation and environmental targeting efforts. In some cases more unique views are identified indicating alternative perspectives, and recommendations according to the varying experiences and roles of the respondents.

4.1 EU level: The European Commission

The European Commission was perceived to have the greatest influence on the RP scheme. However this was often perceived negatively as a consequence of EU bureaucratic and regulatory controls in particular in reference to the auditing process. As a mandatory aspect of RDP monitoring for the European Commission, the auditing process was accepted by the majority of respondents as necessary to ensure that the rules are followed. For example *"the audit rules are there for a purpose, they're there because they've been abused in the past"* (Central Government member). However the auditing process was also heavily criticised and perceived to hinder the efficiency of the RP scheme, and subsequently its effectiveness. As one respondent commented: "*all the outcomes that the policy lot want to achieve with that European money… it's not delivering nothing but it's delivering far less than it should or it could. And a lot of that is down to what's lost in continually having everything verified, validated, revalidated and checked"* (coordinator). This comment was representative of the majority of respondents who were critical of the extensive resources required to administer the policy rather than contributing directly to outcomes.

By contrast, fewer respondents perceived auditing to assist the policy in focusing on outcomes; "*I think that if we didn't have a European structure, the programme might be the poorer for it, because Europe is asking for a number of controls, and seeking to ensure that the program delivers against particular outputs or outcomes"*(Central Government member). Nevertheless, the same controls were believed by others to negatively affect policy inefficiency and policy outcomes by deterring applicants. The majority of respondents indicated that auditing was associated with bureaucracy and that the threat of financial penalties deterred applicants as "*that's what's got everybody scared now*" (RPAC member). This fear was harboured by the staff administrating the scheme also *as "If we [regional staff] go out and inspect something and get it wrong, you know the repercussions from an audit point of view is that Scottish Government has to pay back millions of pounds to Europe"* (coordinator). Both these comments also indicate that the system is working as expected to encourage rules are abided by, ensuring accountability, irrespective of the administrative burden.

However, some of the issues associated with auditing are reportedly avoidable as a result of central government's policy development and decision to prematurely launch the scheme. For instance one respondent insisted that "*a lot of the early applications went in before the guidance was even out...and inevitably there's been a lot of discrepancy and inconsistency"* (RPAC member). Furthermore some argued that the scheme could have benefited from linking the European Commission inputs to those administering it at local level, as *"... if you were designing something you would check first of all whether people are likely to use it; like us [the case officers] that it was working, and you would check with the people who were auditing it [European Commission] that its supplying everything that they need"* (case officer). This highlights how some respondents believed that the initial implementation of the policy could have been improved with increased contributions from both an EU, and more regionalised level, consistent with the model of multilevel governance.

Another weakness in the RP scheme is the time taken for decisions to go through the European Commission. For instance, for an option amendment *"...we had to get it changed internally, and it had to go up and up and up, and it had to go to Europe and it came back and it was over a year, and effectively it involved changing the word 'and' to the word 'or'"* (case officer). So whilst the European Commission does not formulate the options, the process and authorisation checks required at that level are perceived to inhibit scheme implementation. This includes not only a longer time frame, but also links to the rigidity of the process once policy options are framed. A Central

Government member for instance commented "*that kind of [option] detail is getting approved within Europe and therefore that has to go through statutory instruments in Scottish parliament, …and if we don't translate it properly into the option and then translate that into the application process then we are deemed to of breeched the European sanction we've been given for it"*. Such responses indicate that despite the possibility of those at a regional level influencing and improving policy, the processing requirements at each level of government and subsequent delays acted as barriers not only to decentralised decision-making, but also for affected applicants.

Lastly a few respondents were critical of the budgetary controls set by the European commission. For example, one member of Central Government said *"It's quite inhibiting in terms of budget management, and also because of the fact that you are committing money in advance, you don't know if the project's going to happen, so there could be multi-millions of pounds committed to projects that might fall".* This was noted to have problems with domestic funding that needs to be matched with EU contributions *"…because of the way government accounting works, … If you don't spend the money this year then it's gone, so we can't roll it forward to the next year…[due to] treasury accounting regulations"* (Central Government member). This highlights the issue that if allocated budgets remain unspent due to the uncertainty of policy uptake, unspent budget allocations will no longer be available in the future. This consequently limits the flexibility of policy implementation in terms of the ability to shift funds according to policy uptake and/or changing rural priorities over the course of the five year programme.

4.2 Central Government

The influence of the Scottish Government on the RP scheme was also considered to be high, although respondent perspectives varied according to their roles and experience of the centralised government system. For instance, respondents in central Government and regional level RPACs had first-hand experience of the Scottish Government's role in RP policy formulation, targeting abilities, and financial controls.

Almost all respondents acknowledged that the Scottish Government had the biggest role in formulating the RP scheme. For instance: *"There were a number of people who were really driving it from the Scottish Government and they introduced the scheme, the minister obviously approved it. They had meetings with representatives from these organisations, and sometimes they were influenced and changed things, and sometimes they stuck to their guns"* (RPAC member). This indicates that while RP

policy formulation did involve wider consultation, it was the final decision of Central Government and minsters that had the most influence. The majority of regional respondents perceived regional influence on policy formulation as minimal: "*I would say it was a done deal. I don't think the RPACs had any influence over that really, I mean maybe around the edges, but nothing substantial we were presented with as it is"* (RPAC member). Some respondents perceived central government to be ill-equipped to make decisions about the practicalities of scheme implementation. For example, one said: *"they may well be perfectly effective managers and all the rest of it, but they do not understand what they're dealing with, not at that level, and they certainly don't understand the operational level, and the problem you get is that basically they make choices and make decisions without a proper understanding"* (RPAC member). This reflects a common viewpoint of respondents that those closer to the level at which the policy is being implemented are better informed and experienced to make decisions that will impact those areas.

Regional staff often argued that further decentralisation of the RP scheme was needed in order to make decision making more effective. As one respondent from Central Government admitted *"RPACs felt in some way strangled...they felt they could have given more added then they were essentially allowed".* Another from regional government added *"our role should have been have been to bring our expertise at a regional level to bear influence on policy".* However, despite a common call for the devolution of further powers to the RPACs it was also recognised that further decentralisation would still not be the solution and Central Government still needs to retain control of the process. For instance one Central Government member claimed;

> *"regionalisation didn't work in this program…and we [central government] need to make sure it happens next time. But whether that is through the RPACs or through a collaborative approach between central and local government and other players…Europe doesn't give us the money and say here you are get on with it, we [central government] have to draw up our own priorities and defend them to the [European] Commission, so we'd be asking others [e.g. regional governments] to do the same".*

This point highlights that how regionalisation is achieved in practice is still undecided for the future of the RDP. Nevertheless it suggests that a multilevel approach is a pre-requisite for the accountability of public spending.

The results indicated mixed responses about the effectiveness of centralised government targeting efforts with comments centred on the introduction of national targets and the scoring mechanism of the RP scheme. It was suggested that projects that

met certain wider national government objectives were being effectively prioritised. This was noted by respondents, for example, to be the case for climate change options relating to the creation of woodlands. One respondent suggested that: *"when the national targets came in for woodland planting or for protected sites, then it gives such a boost on the scoring it gives more reassurance to the applicant that if they try to hit a national target more chance that it will get successful"* (case officer). This would be the case for all the national targets where applicants would automatically score highly and therefore their projects were more likely to be approved, and hence proving an effective incentive to apply for the target associated options.

Respondents also commented on the success of central government's decision to amend the scheme post implementation to further prioritise the national targets for both woodland and SSSI management options by introducing an 'ongoing approval process'. This refers to the ability of the RPACs to allow applications that are directed at forestry and other designated sites to bypass the RPAC rounds. This consequently *"has been a positive recent innovation … we've had a number of sites which have gone forward under that because we're not tied in with the RPAC application assessment process"* (RPAC member). This was viewed positively by all respondents as it meant the faster processing of cases providing further incentives to eligible applicants and consequently increasing uptake of those options.

However respondents also voiced concerns about the exclusivity of the scoring system and national targets. For example, as one respondent said, "*unless you are introducing management on a designated site or otherwise meeting a national target, or examples where a number of land managers have collaborated …unless you are doing those things you are not going to get funding"* (case officer). Whilst some respondents saw this as the competitive process working effectively, others felt that some high quality applications were consequently slipping through the system. This was especially the case for environmental projects applied in the 'wider countryside', which reportedly often failed to achieve funding because they were not directly targeting one of the central government objectives. The consequences of this were made clear by an RPAC member: *"….if we spend all our time looking after SSSI's, the jewels in the crown, and we don't look to the impoverished sites that need upgrading for the species to migrate out and survive and so on, we're wasting our time".* This comment could be interpreted as caution for strong targeting efforts, however more likely highlights that the scoring system itself is the problem as another respondent added *"the trouble with national*

targets is that because they confer an advantage in the scoring, that everyone wants to hit the national target. We get a lot of tokenism" (case officer).

The scoring system, despite amendments, still suffers an inability to adequately differentiate between the application types from capital projects to agri-environmental. Representative of many respondents opinions, it was recognised that "*trying to provide a scoring process that fits all types and all measures…is quite difficult to do, because they are so different in nature"* (coordinator). It was proposed that the scoring system would work better if tailored to the types of projects that were being assessed, for instance to *"make it [the scoring system] cleverer and so it reflects a different type of measure"* (coordinator). Thus environmentally-oriented applications would have specific criteria suited to those types of projects with a necessity for flexibility in decision making to recognise cases that may not necessarily hit national targets, but still offer good value for money and environmental benefits.

Overall, the majority of respondents felt Central Government power was ultimately retained through financial controls. Autonomy was perceived to have remained centralised through the setting of budgets and the scoring thresholds, and the control of option payments. The majority of respondents believed that central government *"does have influence because it decides… that money is available or that money isn't available"* (Central Government member). The control of budgets is perceived to directly impact outcomes as to how options are incentivised to applicants e.g. associated payments, as well as what applications are approved in the scoring system. As an RPAC member noted about the scheme *"ultimately what gets through is how you weight the scoring system"* which is determined by Central Government.

4.3 Regional Government: RPACs

The RPACs were perceived by respondents to have some influence on the scheme, but less than that of central government and the European Commission. In the design of the scheme, the main influence of the RPACs was reported to relate to the development of the regional priorities and assessment and approval of project proposals for their region. RPAC inputs were expected to improve policy targeting at a localised level, through their knowledge of regional needs and wider stakeholder engagement, however in retrospect many respondents believed this was a 'non process'. This was evident by the setting of fairly unanimous priorities across each of the RPAC regions. For example, one respondent said regional priorities were *"bit of a misnomer…, they are pretty standard across all the regions. There are very minor variations in the wordings but in*

general they are national priorities rather than regional" (case officer). This was perceived amongst other reasons to be due to the multiple inputs from a wide range of stakeholders: *"everyone wanted their own priorities, so in effect, unless you have a tightly managed process it just ended up that all the regional priorities are exactly the same"* (RPAC member). Wider stakeholder engagement can often lead to such outcomes whereby increasing participation in decision making also increases the number of opinions making it more difficult to identify specific targets that can be agreed on unanimously. Yet as the respondent advises this issue could be addressed by stricter facilitation, following consistent guidelines as set out by central government.

The formulations of regional priorities were also agreed to have failed due to the lack of regional financial autonomy. Respondents frequently identified the lack of financial control at a regional level as hindering RPAC decision-making. The provision of a regional budget was perceived by most respondents to be essential to achieve flexible regional prioritisation. For example:

> *"if you had a regional budget you then have to decide on…we have to get the best for our region, which is judging very high quality applications in our region against average applications in our region. Whereas at the moment what we're judging is the money coming into our region, and the risk is that if we turn down something average here, the high value one is somewhere else"* (RPAC Member).

This would result not only in prioritisation, but also greater flexibility during the course of the programme in targeting emerging issues.

Whilst some respondents felt that further regional autonomy was necessary to achieve better targeting, others felt that a central decision making system was preferable as "*if you invite someone onto the RPAC whose only remit is to represent their region, be it local council or economic development or what not, they're not pre disposed towards the national interest"* (RPAC member). Another respondent argued for the need of central government to control management and budgets to avoid inequitable funding and to ensure that disadvantaged areas also benefit, for example:

> *"a lot of the funding has gone to a lot of the well-heeled areas, because that's where the demand is, whereas in a policy context the reverse may have been what you wanted to achieve, that you put your funding into the more deprived areas, so regional delivery has huge flaws unless it's tightly controlled"* (RPAC member).

However, respondents felt that the lack of prioritisation was not determined by the inability of these regional decision makers to prioritise specific needs, but due to the absence of financial incentives. In the current RP system each RPAC competes for a

national pot of money, yet many regional respondents felt further targeting and the formulation of regional priorities would have been improved by the allocation of regional budgets. However respondents often noted the complication of managing and allocating regional budgets, e.g. a coordinator commented that: *"Trying to match up the domestic budget demands against Europe drawn down is really difficult at national level, to then split that up into 11 agents … I can see from budget manager point of view that's really a very difficult process"*. Despite this concern, the vast majority of respondents believed that regional budgets would be essential if the scheme were to become truly regionalised and for effective targeting to be achieved.

5. Discussion

Multilevel governance and wider stakeholder participation as encouraged by the European Commission, has evidently been the template for the structure of the Scottish Government's RP scheme (COM, 2005; 2011; Scottish Government, 2008). Given the diversity of regional characteristics, adopting a multilevel governance approach to promote regionalisation was a logical approach for Scotland's RDP development. Consequently these recommendations were incorporated into the design of the RP scheme, through the introduction of the RPACs (Scottish Government, 2008). However, the results presented here indicate that whilst distinct multilevel structuring and interactions are in place in the RP scheme, the perceived potential for participatory decision making remains limited. A consequence of this is to hinder environmental targeting efforts.

Respondents felt that both central and EU level government have a monopoly of power, mainly through regulatory and financial controls. It was noted that across government levels, predefined budget allocations were perceived to hinder flexibility in decision making and adaptation of national and regional targets. For example, this was a critique from central government of the European Commission requirement for budget allocation predictions pre-RDP launch. Additionally regional RPACs felt that the central government's current funding allocation per RPAC round and the setting of the scoring thresholds prevented them from adapting to changing regional needs. It is debatable whether this was a deliberate decision by centralised decision makers to keep control of the process and avoid the 'fragmentation of accountability' (Peter and Pierre, 2004; Bovaird, 2005). Hence, the current RP system attempts to ensure consistency and accountability, but reduces flexibility as a consequence. The European Commission actions are evident of this, by ensuring Member States take a balanced approach in

addressing each of the Axes objectives with predefined budget allocations that also indicate which areas of RDPs are to be prioritised (COM, 2008a). The predefined budgets are indicated as a problem as post RDP launch priorities have evolved and the response of applicants to certain RDP options is also unpredictable, thus the need for flexibility.

The regulatory controls and monitoring through the auditing rules and checks imposed by the European Commission were clearly unpopular. Auditing also provides conflicts within a multilevel governance system because of an apparent mismatch between interests and inputs. This arises from the regional preference for a focus on outcomes and targeting contrasting with a centralised focus on process to ensure accountability. Central Government is required to audit the scheme to check rules and guidelines are being followed, but the core criticisms centred on scheme formulation and premature implementation (COM, 2011a). Respondents felt that as a consequence of centralised policy maker's inadequate preparation, and the guidance and rigidity of the RP policy, effective delivery was compromised. Consequently, auditing has since identified numerous faults within the RP implementation and required a disproportionate amount of resources to monitor and resolve these issues. Respondents recognised that participatory governance cannot overlook the need to provide value for money mainly through checks and balances to ensure compliance with wider EU rules and regulations (Bovaird, 2005; COM, 2008b). However the issue remains that it is these very checks and balances that raise scheme transaction costs and decrease efficiency. Beckmann et al. (2009) argued that higher transaction costs were a result of decentralisation, yet the results of this research indicate that for the RP scheme this is a consequence of a centralised approach.

Moreover, apart from policy pre-launch issues, respondents criticised Central Government auditing as negatively influencing scheme effectiveness. For example, the strict policy formulation and framework with rigid option criteria, and cumbersome scoring and assessment processes were perceived to inhibit prioritisation by regional decision makers. Regional government staff felt that their expertise is underutilised in the current system because of central government withholding power in order to regulate the policy process. The emphasis on the policy process was seen to outweigh consideration for policy outcomes, in terms of the effectiveness of policy targeting. This was suggested to be a consequence of having a multilevel governance system. Those at a regional level felt detached from the process because of multiple governmental levels. In one example a case officer was able to pass an option amendment through to Europe,

but reportedly this took over a year to happen. This example emphasises the major cost of a multilevel system, supporting the assertion (Tsebelis, 1995) that multiple administrative levels and 'clearance points' lower policy effectiveness creating time delays in decision making.

Respondents suggested that future policy formulation would improve by integrating EU level government requirements with regional expertise on the practicalities of decisions, thus avoiding many of the issues identified post implementation. These suggestions are in line with the principles of subsidiarity allowing the involvement of regional decision makers who better understand the needs and processes at that scale level (Leach et al., 2002; COM, 2009d; Newig and Fritsch, 2009; Mann and Gennaio, 2010). Central government recognised the need for regional input however failed to achieve this in practice (Scottish Government, 2008).

The results supported the observation that local authorities are predisposed to prioritise economic considerations (Demmke, 1997). This was demonstrated by the formulation of the regional priorities and the willingness of the RPACs to keep national funding options as wide as possible through broad regional targets for each of their regions.

Yet, regional respondents recognised this weakness, and believed that this becomes inevitable when regions compete for a national pot of money. The majority of regional decision makers perceived financial incentives to be essential in order for them to successfully narrow down regional targets. Groenendijk (1998) suggests that centralised funding mechanisms are detrimental to the establishment of integrated and responsive policy making at a local level, and that for true regional autonomy; regional budgets are required to enable appropriate decisions at an appropriate level (Groenendijk, 1998; COM, 2009d). Although a few respondents were concerned about the complexity of the allocation process, the majority contended that this was a crucial step for regionalisation to work in practice (COM, 2008a).

The results also indicated that despite scheme pitfalls in accomplishing regionalisation, some central government environmental targeting efforts were successful. Respondents noted that the strengths of the scheme came through the national targets and the ongoing approval system for SSSI and forestry applications. These scheme amendments were perceived to have influenced both the type and increased the number of applications associated with the desired targets. Yet some respondents remained sceptical that applications tailored to meet these objectives, were based on 'tokenism' rather than suitability. From a broad policy perspective this is not

an issue as collective action is required to achieve nationally rather than locally important outcomes (Dahl, 1994).

Conversely, with such an important influence on policy uptake it was recognised that other potentially good quality applications that did not meet appropriate targets were slipping through the system. For example, applications related to the 'wider countryside' areas, outside of targeted zones, had difficulty entering the scheme (Chapter 3). However, it is argued that these very areas are essential to promote and manage biodiversity, especially to reduce the impacts of already fragmented protected habitat areas (Sutherland et al., 2006; Jackson et al., 2009). Wünscher et al. (2008) and in Chapter 3 argue that spatial differentiation in the targeting mechanism can improve policy efficiency and assist the assessment of the cost and benefits of option uptake with respect to the spatial characteristics of those regions and locations. This is especially important in avoiding the risk of habitat fragmentation and over saturation of particular regional options ensuring better value for public money, by supporting more informed decision making (Finn et al., 2009; Chapter 2).

6. Conclusion

Whilst multilevel decentralised governance systems are encouraged as the preferred approach to EU RDP development, their administration has an impact on the effectiveness of environmental targeting efforts. In Scotland, the RDP design attempted to incorporate both a centralised and decentralised approach. However, in spite of the introduction of regional decision making bodies, in practice these only enact centrally-driven procedures with limited local autonomy. In addition management and financial resources and accountability are determined at the central government level.

It is unclear what direction future RDP policy will take, both at an EU level and by individual Member States. However a balance between efficiency and effectiveness needs to be achieved in line with the principle of subsidiarity. The difficulty will be balancing how decision making capabilities can be enhanced and supported, but also regulated across each tier of government. From a regional perspective this would require further financial autonomy of RDP funds, but also a system that allows flexibility to incorporate professional judgements of locally informed decision makers (Leach et al., 2002; COM, 2009d; Newig and Fritsch, 2009; Mann and Gennaio, 2010). From a central government standpoint consistency, transparency and accountability are paramount for public policy implementation, yet arguably this could still be achieved more efficiently through a less complex, streamlined system (Berger, 2003).

Ultimately within a successful multilevel, governance system integrating policy from the EU and regional levels is critical in incorporating European objectives, guidelines and regulatory expectations with inputs from regional experts. In this way, regional decision makers can take ownership of the policy and arguably provide realistic solutions to achieve European Commission requirements alongside opportunities to promote regional environmental needs. The role of central government would be to oversee the process and ensure efficiency and accountability. Moreover each level of government should emphasise policy outcomes that provide the best value for public money but that also differentiate between the needs of both national and local levels in effective targeting.

Chapter 5: Conclusion

1. Chapter overview

This final Chapter synthesises the findings from the RDP three evaluation approaches taken in this study: 1) spatial econometrics; 2) stakeholder analysis; and 3) qualitative interviews. The strengths and weaknesses of using these different qualitative and quantitative methodologies and their abilities to give in-depth insights into RDP are examined. Key findings from the three methods are summarised alongside future policy recommendations. Finally the Chapter identifies the future outlook for RDP 2014-2020 drawing on final insights on policy evaluation. Overall the findings from each of these approaches combined provide a broader understanding into how policies design, stakeholders, and spatial characteristics impact policy implementation and environmental targeting abilities.

2. Introduction

Rural Development Policy (RDP) as a component of the Common Agricultural Policy (CAP) is an important EU policy mechanism to achieve integrated economic, social and environmental objectives (COM, 2008a). Policy evaluation is a mandatory aspect of RDP (COM, 2008a). As a consequence, the European Commission introduced the Common Monitoring and Evaluation Framework (CMEF), which provides a consistent approach to RDP evaluation across the EU for the 2007-2013 programming period (COM, 2006a). However implementation of the different CMEF methods has varied across EU Member States. In particular, assessing environmental impacts has proved complex due to insufficient time for the collection of monitoring data, accounting for other influential factors, and comparatives to counterfactuals[16] (Scottish Government 2010; COM, 2010; COM, 2013d; Chapter 2).

In addition to measurement difficulties, CMEF indicators are limited in their capacity to capture the systems, processes and influences that determine policy outcomes. To develop an informative policy analysis, influential factors (whether quantifiable or qualitative) need to be assessed in terms of whether they have

[16] Counterfactuals refer to what would have happened without a given policy intervention (COM, 2013d).

impeded or facilitated successful implementation (Fudge and Barrett 1981; Winter 1996; Berger, 2003; Juntti and Potter, 2002). Spatial econometrics and the quantitative indicators of RDP policy can be used to explore uptake and expenditure; (Chapter 2). However, the less tangible aspects of policy design and the influence of individuals, groups and institutions on uptake can also be understood through qualitative methods. Stakeholder analysis techniques, in particular 'stakeholder mapping', can identify the role of stakeholders and power relationships in policy implementation, and stakeholder interviews can identify further influential aspects of policy design and implementation (Chapters 3 and 4). These methods can address the notion of causality by considering the relationship between policy actions and their implications. Hence, understanding the casual influences of policy performance provides a potential tool for enhancing future decision making capabilities.

This chapter assesses the ability of three methods: 1) spatial econometrics, 2) stakeholder influence mapping, and 3) qualitative interviews, for RDP policy analysis. This chapter firstly provides a brief overview of policy evaluation and its application to RDP. The three methods are then described, and their strengths and weaknesses discussed, based on an analysis of Scotland's RDP Rural Priorities scheme. Finally the chapter discusses the implications of using these different methods in future policy evaluation and the benefits of adopting a mixed method approach.

3. Policy evaluation

Policy evaluation is necessary to assess the processes and impacts of governmental policies and programmes, and their ability to meet desired outcomes. Policy evaluation is described as: *"a range of research methods to systematically investigate the effectiveness of policy interventions, implementation and processes, and to determine their merit, worth, or value"* (Government Social Research, GSR, 2007 p.3). Policy evaluation is however inherently complex due to the number of possible methods and indicators that can be used for assessment, further complicated by the number of potentially influential factors.

In policy analysis 'indicators' are useful for assessing states and trends, and to help in comparing policy performance from local to international levels (COM,

2006a). Indicators can identify if there are differences between what policy makers hope to achieve and the actual outcome, often known as the 'implementation deficit' (Weale, 1992). However policy actions may not translate well in reality for a number of reasons such as clarity, time, resources, and interdependencies between other policies and other external factors (Winter, 1996). Therefore as Fudge and Barrett (1981, p. 12) assert "*it is essential to look at implementation not solely in terms of putting policy into effect, but also in terms of observing what actually happens or gets done and seeking to understand how and why"*. This highlights the need in policy evaluation to identify not only if differences exist between objectives and outcomes, but also to understand why.

A number of studies have attempted to do this, based primarily on investigations into the RDP agri-environmental measure that have explored the influences and impacts of its implementation. Such factors, as summarised in Figure 18, include, agricultural characteristics e.g. farm characteristics, labour, livestock etc. (Wynn et al., 2001; Dupraz et al., 2002; Hynes and Garvey, 2009; Defrancesco et al., 2008); stakeholder influence e.g. farmers attitudes and behaviours, access to advice etc. (Wilson and Hart, 2000; Siebert et al., 2006; Edwards-Jones, 2006; Ruto and Garrod, 2009); bio-physical characteristics (Giupponi, et al., 2006; Langeveld et al., 2007); economic factors (Wilson and Hart, 2000); socio demography (Vanslembrouck et al., 2002); and policy design (Classen et al., 2001; Ferraro, 2008).

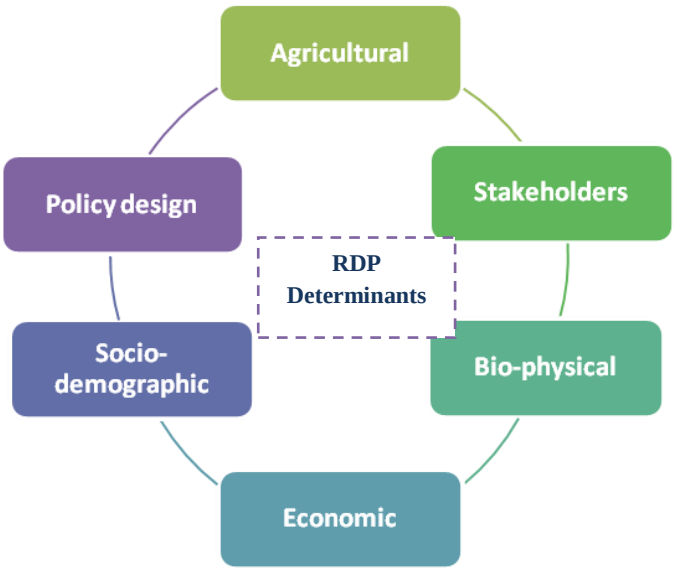

Fig. 18 Determinants of RDP implementation

To account for these complexities and interacting policy determinants, the European Commission introduced a consistent system for monitoring and evaluating the RDP (COM, 2006a). This system requires Member States to provide a number of indicators to assess whether RDP 2007-2013 is meeting its objectives, based on the Common Monitoring and Evaluation Framework (CMEF).

4. RDP evaluation

The CMEF is based predominately on quantitative indicators to assess RDP implementation (COM, 2006a). These indicators reflect the series of steps in policy delivery, as shown in Figure 19. This includes the 'baseline' indicators, which reveal economic, social, and environmental conditions pre-policy implementation, and the 'input' indicators, which represent allocated funds reflective of those conditions (COM, 2006a). The 'output' indicators, post RDP implementation, represent initial activities such as committed expenditure and numbers of participants, followed by 'result' indicators that go further in representing the benefits gained by implementation e.g. area of land under successful management (COM, 2006a). 'Impact' indicators measure the wider effects of policy implementation, e.g. reversing the decline in biodiversity by measuring farmland bird species (COM, 2006a).

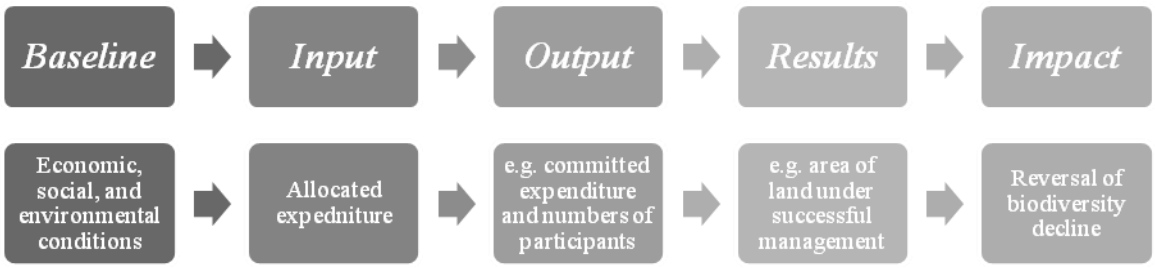

Fig. 19. CMEF indicators and example of associated indicators

There are varying degrees of difficulty in collecting CMEF indicators (Chapter 2). For instance, the 'impacts' of RDP measures are very difficult to assess, especially with respect to environmental indicators, due to insufficient time from implementation, establishing counterfactuals, and identifying actual cause and effect

relationships (COM, 2010). To some extent these difficulties were anticipated in the formulation of the CMEF impact indicators, with the inclusion of expert qualitative assessments (referred to as '*bottom-up estimation of impact'*) also deemed acceptable as an alternative (or in addition) to quantitative indicators (COM, 2006a, p.14). The strength of quantitative indicators however, is in their ability to make 'statistical generalisations', so that inferences can be made (Onwuegbuzie and Collins, 2007). This is noted as a 'positivist' approach concerned with objectivity, replicability and causality (Bryman, 1984). The European Commission has mostly taken this approach with the CMEF indicators, identifying EU averages and comparing RDP Member States at programme level in order to assess if they are above or below the overall average (COM, 2011b; 2012a; 2012b).

The CMEF indicators have further potential for statistical analysis at a disaggregated level, allowing Member States to examine RDP in greater detail. Although not a European requirement, CMEF quantitative indicators can be used to decipher, through a spatial analysis and modelling approaches, potential determinants of policy outcomes (Chapter 2). Such analysis provides insights into 'where' and 'how' RDP objectives are being met in practice (Chapter 2). Despite being a 'voluntary' addition to evaluation, qualitative investigations into RDP may also offer valuable, but alternative, policy insights (Chapters 3 and 4).

Qualitative research, an as 'interpretivist approach', is based on human judgements and is increasingly recognised as a valuable contribution to policy formulation, evaluation and refinement (Spencer et al., 2003; Cook, 2009; Scottish Government, 2010a; Chapters 3 and 4). Research techniques include in-depth interviews and participant observation, enabling the researcher to gain the perspective of those experiencing the phenomena (Hesse-Biber and Leavy, 2011). However qualitative research has been criticised for validity and reliability, although these issues can be addressed through a rigorous methodology (Guba, 1981; Krefting, 1990).

To address the limitations of both quantitative and qualitative policy research, a mixed method approach has potential value. By using the two approaches in combination, it is possible to offset their weaknesses as well as increasing the breadth of the study (Blake 1989; Greene et al., 1989, Rossman and Wilson 1991;

Driscoll et al., 2007). Different mixed method approaches produce different outcomes. For example triangulation 'seeks convergence in results' and therefore the findings from combined approaches are used to validate each other by seeking the same objective[17] (Mark and Shotland, 1987). Alternatively there is 'expansion' in a mixed method approach that extends the breadth and range of inquiry by using both methodology types for answering differing questions on the same topic (Mark and Shotland, 1987; Greene et al., 1989).

In summary, to understand in practice the strengths and weaknesses of each approach for RDP evaluation, (whether qualitative, quantitative, or mixed), their application to the same study location and policy should be compared. A comparative review of each will further identify their utility individually and in combination for RDP evaluation purposes. This is based on the chapters 2, 3 and 4 focused on RDP evaluation for environmental targeting, and Scotland's RDP Rural Priorities scheme. Firstly a quantitative approach was taken by using spatial econometrics to identify the determinants of RDP measure uptake and expenditure (Chapter 2). Secondly a mixed method approach, triangulating interview data with quantified stakeholder mapping results was undertaken, to assess the influence of stakeholders and governance structures on RDP policy outcomes (Chapter 3). Finally, a purely qualitative study based on semi-structured interviews with policy stakeholders was conducted to assess multilevel governance, decentralisation and implications for the environmental targeting of RDP (Chapter 4). Each of these methods will be discussed systematically, with a brief description of the method, data, and findings, and the associated methodological strengths and weaknesses.

4.1 Spatial econometrics; quantitative RDP evaluation

4.1.1 Method description

Chapter two explored the use of spatial econometrics to analyse the determinants of participation and expenditure for Scotland's RDP 2007-2013 agri-environmental measure. The approach was undertaken to utilise the availability of quantitative CMEF output indicators, and to examine the factors influencing policy participation and expenditure for the agri-environmental measure, while accounting for spatial

[17] Triangulation refers to two or more methods being applied to the same phenomena to verify or refute outcomes (Greene et al., 1989)

dependency[18]. The analysis identified statistically significant explanatory variables based on farming characteristics, land capability, designated sites status, and accessibility and population. These significant determinants were related back to policy criteria in order to assess how agri-environmental measure priorities were being met and consequently to provide insights into the targeting performance of the measure. For example, the majority of the models indicated a positive significant relationship with the SSSI's (Sites of Special Scientific Interest), which as designated sites are prioritised in Scottish policy. The findings showed that, to some extent, national environmental targets were indeed being met in practice.

3.1.2 Method Review

The use of a spatial model was justified because model fit was better than the equivalent non-spatial linear regression models, indicating that spatial interdependency was important. By using municipality level datasets, the study was also able to assess Scotland's RDP measure performance, and provide nationally relevant policy generalisations. The same analysis could also be conducted for regional comparatives to account for regional diversification and to inform regional decision making.

However, the predominant weakness of this approach is data availability. The analysis focused on CMEF output indicators, however if available the same methods could be applied to assess impact indicators, which would give greater insight into actual policy 'effectiveness'. Consequently, the method lacked flexibility, because understanding phenomena was only possible within the constraints of the available data (Bryman, 1984). This may also explain the low correlation coefficient (r^2) in the models (i.e. ranging from 0.42 to 0.13), which suggests that while numerous influential factors can still be attributed to RDP agri-environmental measure adoption, many of these cannot be easily quantified (Siebert et al., 2006; Chapter 2).

[18] Spatial dependency if the form of autocorrelation demonstrates near things are more related than those distinct, indicating that data observation are not independent, as assumed with non-spatial linear regression models (Tobler 1970; Hynes et al. 2008).

4.2 Stakeholder mapping; mixed method RDP evaluation

4.2.1 Method description

The third chapter examined the implications of stakeholder power relationships within different governance structures in the context of Scotland's RDP. This study adopted a 'mixed method' approach synthesising the findings from 61 in-depth semi-structured interviews with institutional policy stakeholders and a stakeholder mapping exercise. The aim was to quantify the perceptions of respondents about the relative 'influence' and 'interest' of different policy makers (Chapter 3). Analysis of the qualitative interview data consisted of identifying, coding, and categorizing patterns or themes in the data, whilst for the mapping, multivariate statistics were used to test differences in respondents' perceptions according to their group attributes (related to job role, region and organisation affiliation). In addition, the mean observation for interest and influence per stakeholder was calculated and displayed in scatter plots. The stakeholder analysis and mapping assessed the application of the EU's good governance principles in the implementation of the RDP in Scotland. Whilst the principles of 'good governance' - openness, participation, accountability, effectiveness and coherence - outlined by the European Commission (COM, 2001), were incorporated into the Rural Priorities scheme design they were not applied equally. Trade-offs were identified between the principles, which highlighted the difficulty of achieving good governance and the prioritisation of environmental needs in practice. Furthermore, the attempts to widen decision making has resulted in a number of stakeholders perceiving themselves as less empowered within the revised scheme. Moreover the statistical analysis revealed that the differing perceptions between respondent groups presented barriers to consistent and coherent policy delivery, findings which were further supported by interview responses. Results from both methods indicated that power imbalances between stakeholders prevail, questioning the equity and effectiveness of RDP policy efforts (Chapter 3).

4.2.2 Review

The mixed method approach was potentially able to compensate for the weaknesses of using qualitative or quantitative methods alone. For example stakeholder mapping may contain hidden assumptions either from the respondents or the researchers, but

by supporting results with qualitative findings further verification and support were provided for respondent choices (Reed et al. 2009; Chapter 3). Moreover whilst qualitative findings are arguably subjective, further validation is achieved through triangulation with the stakeholder mapping in addition to sufficient respondent representation.

However a notable weakness of the quantitative statistical analysis was that the respondent attribute sample sizes were sometimes too small to produce significant results. This reflected the limited capacity and willingness of potential respondents with those attributes to participate, and a low number of observations for identified stakeholders also resulted in insufficient group sizes. This latter point was influenced by respondents' individual experiences and perceptions, which meant certain stakeholders, to which they had no direct network links, were not recognised. However, for the mean analysis of stakeholder power this was not an issue due to the overall respondent sample size and diversity allowing a more comprehensive identification of the policy network.

4.3 Semi-structured interviews; qualitative RDP evaluation

4.3.1 Method description

The fourth chapter focused on purely qualitative research techniques, drawing on 61 semi-structured interviews with institutional policy stakeholders. The aim of this Chapter was to assess in detail the application of multilevel governance and decentralisation, and the implications of this for policy targeting. Multilevel governance refers to the coordination of EU policy development and implementation between the European Commission, Member States, and regional authorities (COM, 2009). The Scottish RDP rural priorities scheme was first examined to identify aspects of a more inclusive governance approach to enhance environmental targeting in its policy design (Chapter 4). Secondly, qualitative interviews were conducted with regional and central government policy stakeholders to assess efforts to regionalise decision making and further prioritise environmental needs. The findings indicated that despite including objectives to regionalise decision making, power remained centralised, and this in turn impeded the effectiveness of regional targeting

4.3.2 Method Review

The qualitative interviews provided a number of deeper insights into the performance of the RDP rural priorities scheme (Chapter 4). Respondents were able to draw on their personal experiences of how policy was formulated and implemented and provide in-depth critiques as a result. This meant that in contrast to quantitative studies, the analysis was primarily inductive rather than deductive. The large representation of institutional stakeholders gives further validation to the findings, drawing on the common perception that regional autonomy was hindered by the strict controls of the scoring, financial and auditing procedures (Chapter 4).

However the study would have been enhanced by gathering responses from members within the European Commission, to understand the perspectives at a higher governance level. The findings were also highly reflective of individual knowledge and experiences, and therefore subjective. However, the respondents' roles within government and their direct involvement in the scheme mean that they are arguably best equipped to critique the regional scheme implementation and its policy targeting. Moreover, whilst targeting effectiveness can be quantitatively measured to some extent, governance processes and policy implementation are particularly suited to a qualitative analysis, to explore and capture individual and collective policy encounters and perspectives.

5. Discussion

The differing methodologies and their ability to provide a wider breadth of knowledge on RDP evaluation is a strength of this thesis. Policy evaluation is inherently complex due the involvement of multiple stakeholders at various scales, and accounting for a vast range of determinants. The mixed method approach adopted, in this thesis, accounts for the complexities of evaluation. Spatial econometrics provided insights on the uptake and expenditure of AEP through a quantitative modelling approach. Whereas the stakeholder mapping and interviews provided insights on the governance arrangements of RDP, and stakeholder power imbalances. Each of these methods are explored in detail and their findings and potential recommendations are discussed.

5.1 Spatial Econometrics

The European Commission introduced the CMEF indicators in order to address difficulties and inconsistencies in monitoring and evaluation of RDP. Chapter 2 demonstrated the opportunities and limitations of these indicators. In the absence of impact indicators, the Chapter explored insights into patterns of RDP uptake and expenditure. The spatial econometric analysis of the CMEF indicators presents an opportunity to go further than simply measuring change of RDP outputs, but enabled an assessment of influential determinants and how these relate to progress towards policy goals. Additionally, the assessment and breakdown of the AEP measure to option groups can provide both national and regional decision-makers the opportunity to better understand how and where RDP is being implemented locally. Spatial maps can indicate visually regional clusters of high and low uptake and expenditure but the methods further the understanding to why those clusters and anomalies may be occurring. For example whether determined by site designations, and /or biophysical or structural aspects etc. The provision of such information could be a powerful tool to justify flexible targeting and policy amendments to adjust to changing needs.

For example the RSPB and SSSI results indicate that targeting efforts by the government and NGOs can be effective. From a policy perspective national targets are being met. However the environmental benefits of these implemented options is not apparent, in addition other designated sites outside of SSSI were negatively associated with AEP participation. This could indicate that the habitats outside of SSSI are may not be able to receive support despite their capacity to meet option objectives. These findings highlight that without RDP support for the 'wider countryside' the heightened risk of fragmentation and further degradation may occur (Sutherland et al., 2006; Jackson et al., 2009).

Another important finding, in Chapter 2, was the differences in model qualities between the whole measure analysis and the option groups. The model results for the bird, habitat and water option group were stronger than those of the whole AEP measure. Chapter 2 identifies this as an issue for implementation and evaluation of AEP when a vast number of associated management options come under one measure. For example Scotland's AEP measure has 69 options and sub

options. The strengths of having such a comprehensive list is to ensure eligibility and management criteria are clarified so that applicants and case officers can define the suitability of that option to the land under proposal. These options can be narrowly targeted to specific species e.g. mown Grassland for Corncrakes or wider options such as Mown Grassland for Wildlife (Scottish Government, 2008). The weaknesses of having so many options is that it undoubtedly impacts efficiency with differing option criteria and requirements putting pressure on resources in terms of option formulation, administration, monitoring and evaluation burdening both applicants and implementing authorities. However simplifying the options could impact effectiveness, particularly as specific areas have specific needs. Hence, guidance on suitable options and management are needed. It would however be advisable that RPACs could promote and select AEP options most suitable for their own conditions and needs. RPACs including wider stakeholders should refine priorities and short list appropriate options. Regional decision makers should also have the flexibility to adapt option criteria if necessary to enhance suitability to their area. This is particularly important in a country such as Scotland with a vast range of biophysical conditions.

Also despite complexity policy evaluation should go beyond the AEP measure to single options or option groups at both a national and regional level (as done in Chapter 2) to gain more accurate insights into option adoption and progress towards environmental objectives. Chapter 2 demonstrated the potential for spatial econometrics to address agricultural, socio-demographic, economic and biophysical factors that may impact policy performance. However despite the importance of these findings the quantitative analysis is limited by the availability and quality of the datasets available. This point reflects why evaluation needs to go beyond quantifiable indicators and seek alternative methods to understand further the intangible aspects that influence policy efficiency and effectiveness.

5.2 Stakeholder mapping and interviews

Chapters 3 and 4 explored the intangible aspects of policy evaluation, such as implementation features including policy design and stakeholders. This included the analysis of governance structures and processes, the good governance principles, in

addition to the influence and interest imbalances between stakeholders. In Chapter 3 the stakeholder mapping attempted to make the intangible tangible by quantifying respondent's choices on the extent of influence and interest of varying stakeholders. The means of all the observations per stakeholder were calculated and then triangulated with the qualitative interview data to explain differing levels of interest or influence. This approach worked to verify responses and uncovered potential hidden assumptions found in the mapping results (Reed et al., 2006). Verification was further achieved in the stakeholder mapping by gaining a sufficient overall sample size to capture the breadth of perspectives[19] and the standard deviation of the means further indicating the extent of opinion variation. The KW test was able to statistically verify differences in perceptions according to respondent attributes i.e. organisations and job roles. All these steps contributed to verifying, with the qualitative data, explanations for differing perceptions, accounting for the homogeny of heterogeneity in responses. This was evident in the underlying differences and possible areas of conflict between the delivery organisations in spite of the policy drive for consistency. Results in Chapter 3 highlight the need for continued networking and exchange, but equally the need to resist uniformity in the way in which organisations, with different expertise, are required to deliver policy (Lipsky, 1980; Gibson, 2006; Hupe and Hill 2007).

Yet because of the small sample size the results in the KW test did not determine a significant difference in perceptions between the RPACs eleven regions. This would have indicated different approaches to decentralisation and RDP delivery regionally. Despite these results the qualitative interviews did indicate differences between how decentralization had occurred across regions. Respondents from differing RPACs perceived an improved ability to define and accomplish regional priorities due to differences in how they operated. In examples where RPACs had better success in decentralisation e.g. the Borders and Argyll RPACs, this was indicated primarily to be due to the existing strength of networks between RDP implementers and wider stakeholders. Wider inclusivity positively impacted regional decision-making with a clearer definition of regional needs and gaining wider support through the exchange of information and capacity building. However these

[19] A total of 61 respondents.

approaches still had their limitations with consensus across RPACs that regionalisation of the scheme, as intended, was predominately unsuccessful.

Decentralisation was supported by the majority of respondents in principle, the issues however relate to the process and how those visions were translated into practice. The original vision for the consolidation of RDP measures and objectives into one system fit for all, was ambitious. The problem came as the Rural Priorities scheme aimed to deliver on multiple objectives, increasing its complexity, alongside attempts to regionalise increasing a need for top down accountability. Findings indicated that attempts for stronger accountability came in the form of strict regulatory and financial controls as retained by Central Government.

It is recommended, that to enable regionalisation to work in practice, regional decision-makers need to be provided greater flexibility and discretion to make decisions appropriate to their identified needs. To adequately address these needs and priorities a regional budget, providing regional financial autonomy, could potentially be a step in the right direction. The allocation of funds to regions should be dependent on economic, social and environmental criteria so each RPAC region could prioritise and justify their local needs. CMEF baseline indicators, as in original RDP proposals, could be used to match needs with predicted expenditure. Central Government could then allocate expenditure to regions accordingly and it is then 'once' budgets are allocated, regional decision-makers can decisively identify specific regional targeting requirements within the resources available. Expenditure and uptake can be reviewed annually by Central Government to assess if there is excess or shortage of regional RDP funding in comparison to needs and amended accordingly.

In addition to regional budgets the role of RPACs should also be reconsidered in order to utilize their expertise and also that of case officers. For example currently all applications (apart from those eligible for the on-going approval process, see Chapter 4 p.94) have to go through approval during the irregular RPAC meetings. Respondents argued this was an ineffective use of time and expertise as these checks were based on already allocated scores calculated by case officers. On occasion RPACs considered more unique applications i.e. those with high funding requirements, or proposals that were borderline of the scoring thresholds. However

decisions remained constrained by the scoring criteria and thresholds determined by Central Government.

It is proposed that the RPAC role could be emphasised if case officers [with coordinators] took responsibility for straightforward scoring and approval of proposals. Then RPACs would be freed to concentrate decision-making on the more atypical, borderline, and high-spend proposals. This should, as previously mentioned, include the flexibility to adjust priorities and spending accordingly. This latter point is also crucial to provide RPACs the discretion to guide priorities reflective of current circumstances based on policy assessments. For example if uptake reaches saturation in a particular region for a particular option, e.g. enhancing hedgerows, funding could then be re-directed to other options.

5.3 Qualitative interviews

Chapter 4 logically builds on from the key themes identified in Chapter 3; such as decentralisation, multilevel governance and the implications on environmental targeting. The qualitative approach explored in Chapter 4 revealed more clearly the implications of local authorities restricted decision-making capabilities. The open ended interviews allowed respondents to explore these issues freely and discuss the strengths and weakness of the Rural Priorities scheme at length. For policy evaluation the advantages of this approach are by gathering perceptions from key stakeholder, new and unexpected insights can be found. Subsequently, through a qualitative approach, further determinants of policy performance outside the limitations of available quantifiable datasets can be identified. Thus findings from the interviews captured information unattainable within the CMEF indicators. Quantifiable indicators are limited in their capacity to capture the systems, processes and influences [the how and why] that determine policy outcomes. This is a frequent issue in policy evaluations which often bypasses the agenda setting and policy making stages in their assessments (Schneider, 1986). An oversight like this could be costly as unexpected policy outcomes could easily be a consequence of those earlier stages.

The findings from Chapters 3 and 4 both identified such factors; including the failure to translate goals into practical operational plan, or the provision of adequate

resources each impacting implementation effectiveness (Ingram and Mann, 1980; Schneider, 1986). Whilst multilevel decentralised governance systems are encouraged as the preferred approach to EU RDP implementation, how this is formulated into policy design will impact on the effectiveness of environmental targeting efforts. The qualitative interviews provides evidence of this in the RDP design of the Rural Priorities scheme. For example the emphasis from Central Government had been on process as opposed to outcomes of the scheme. This was indicated to be largely due to the threat of disallowance from the European Commission, and as a result of audits which required a disproportionate amount of resources. Respondents highlighted this unbalanced focus detracted human resources and finances away from providing support for achieving prioritised environmental outcomes. It was recommended that future RDP formulation could improve through a wider stakeholder process. This would require regional stakeholders to contribute to developing transparent strategies, in the policy design phase, that meet the EU guideline requirements but also compliments the expertise of those delivering the policy on the ground. Through an improved multilevel governance arrangement the links between objectives, and a strategy that is practical and implementable can be better defined.

Another key finding in Chapter 4 however was the triangulation of findings from the interviews with those from Chapter 2. As mentioned earlier, Chapter 2's quantitative analysis indicated success in options taken up in SSSI sites, as prioritised in the national targets. Chapter's 4 findings, verify this with the qualitative interviews, identifying some of the [hypothesised] associated issues. One respondent commented that by focusing funds on the 'crown jewels' i.e. the SSSI sites, was a mistake. For ignoring already 'impoverished' sites would reduce the effectiveness of efforts to enhance biodiversity also necessary for species survival. Respondents felt that due to the inflexibility of the scoring criteria and approval process many good quality applications were slipping through the system. As identified in the previous recommendations, this could be addressed by providing adequate discretion and autonomy to regional decision-makers. But this needs to be in addition to ensuring that optimal, and spatially explicit targeting of environmental needs are consistently being addressed.

5.4 Method summary

The combination of the approaches from Chapters 2, 3 and 4 provides evidence of the benefits of adopting a mixed method approach for policy evaluation. These chapters provide a deeper and more holistic understanding of the performance of RDP than any one method could bring. They indicate both the opportunities and limitations of the CMEF indicators and the ability of stakeholder mapping and qualitative interview to supplement for these weaknesses. The RDP evaluation methodologies discussed here identified the immediate effects of policy implementation, but also went further in understanding how and why certain policy outcomes occurred (Fudge and Barrett, 1981). This provides broader understanding of how policies design, the role of stakeholders, and spatial characteristics impact on RDP implementation and environmental targeting capacity, and highlighted the multifaceted nature of the determinants of policy performance. Whilst each method has limitations, these are to some extent compensated for by the other methods (Greene et al., 1989). Moreover, in combination these approaches provide a mixed method analysis of 'expansion' increasing the breath of understanding of influences and outcomes that are both essential for policy evaluation (Mark and Shotland, 1987; Greene et al., 1989).

For instance, spatial econometrics was used to identify significant bio-physical, agricultural, socio-demographic and policy targeting determinants for AEM participation and expenditure in Scotland (Chapter 2). Moreover, the analysis indicated the opportunities and weaknesses within the CMEF indicators for more comprehensive policy evaluation. A strong explanation for the variance was subsequently not found. However, the qualitative and mixed method approach moved beyond a spatial econometric analysis, and revealed further intangible determinants, which would not otherwise have been identified (Bryman, 1984; Chapters 3 and 4).

Chapters 3 and 4 identified aspects of the RDP policy framework and the varying influence of stakeholders as key determinants of policy outcomes. The in-depth qualitative study identified the failed attempt to regionalise RDP policy in Scotland; with power and budgets remaining centralised and consequently

environmental priorities remained broad and vague (Chapter 3). The mixed method approach further explored and validated power imbalances between stakeholders identified the perceptions behind respondent selections. The findings were limited to some extent by the respondents' understanding of the phenomena under question, and may also have benefited from further representation of wider stakeholders (Guba, 1981; Krefting, 1990). However, the quantitative spatial models provided an 'expanded' understanding of RDP implementation, identifying influences and spatial patterns that may not have been apparent otherwise.

Thus, Chapters 2, 3 and 4 demonstrated between them the strengths and caveats of using quantitative and qualitative research techniques. Although the findings were specific to Scotland, the methods are applicable to RDP analysis elsewhere. The CMEF indicators present a step in the right direction for providing a consistent approach to RDP monitoring and evaluation across the EU, but policy makers need to go further in assessing how different determinants facilitate or impede policy performance, especially with respect to achieving environmental targets (Fudge and Barrett 1981; Winter 1996; Berger, 2003; Juntti and Potter, 2002). In-depth, mixed methods can support policy making both at the EU and national levels by ensuring cost-effectiveness and better policy targeting.

6. Conclusion

It is as yet still unclear if the Rural Priorities scheme will be reformed, or even included in Scotland's next RDP, but as a key aspect for environmental delivery, and in response to heavy criticism, change in implementation is inevitable. The future direction of the RDP policy at an EU level however continues to call for better prioritisation and wide actor involvement. Furthermore in the proposed reforms of the CAP, aims outlined include 'encouraging agri-environmental initiatives' as well as 'better targeted income support' looking towards future challenges post 2020 (COM, 2012a, 2012b) calling for a "more radical and geographically-defined strategy of targeting" as argued by Potter et al. (1993, p.200). This is especially pertinent as RDP undergoes reform and undergoes reform and proposed CAP spending cuts become reality (Marsden, 2011; COM, 2012a).

These continuing RDP proposals for improved governance and environmental targeting highlight the need for rigorous ex-ante and ex-post policy evaluation, to ensure lessons are drawn on, with a constant aim for improvement. This direction is thankfully evident in the ex-ante guidelines for the RDP programme period 2014-2020 (COM, 2012d). These comprehensive guidelines emphasise the need for evaluation not only as a legal requirement, but to ensure resources are used optimally to ensure effective outcomes (COM, 2012d). Hence, evaluations are advised to draw from previous programmes to formulate objectives, prioritise measures and policy strategies. This includes the continued use of the quantitative CMEF indicators to set the foundations for indicating RDP achievements and to strengthen subsequent monitoring and evaluation efforts (COM, 2012d). Guidelines also mention drawing on qualitative or qualitative analysis of implementation aspects encouraging the evaluators to work with programming authorities. Yet these guidelines are unspecific. Moreover the request for qualitative information remains ad hoc related only to specific cases, and for the ex-ante analysis.

Overall the direction of the new RDP 2014-2020 calls for better evaluation but evaluation approaches need to link to the proposed objectives such as improvements to environmental targeting efforts and governance (COM 2012d). Policy analysis of the kind presented in Chapters 3 and 4 can provide the baseline against which governance improvements and the impact of stakeholders can be measured. Furthermore Chapter 2 presents a method by which the CMEF indicators could be further utilised to increase our understanding of the hidden policy aspects that qualitative techniques may not address. In summary, these mixed methods can be used as a tool to support future policy making by providing evidence based policy assessments. The information provided by these methods creates a platform to build efforts for the further involvement and influence of stakeholders and groups in accordance with policy objectives. This in turn may lead to readjustments in policy priorities to ensure accountability is not at the detriment to effectiveness, as has been the case in the Rural Priorities scheme in Scotland.

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Appendix A. AEP measure option groups and number of contracts per option

Bird protection	Total number of contracts
RP21402 - Wild Bird Seed Mix/Unharvested Crop Count	953
RP21408 - Management of Cover for Corncrakes Count	215
RP21405C - Mown Grassland for Corncrakes - 1 Sept Count	164
RP21406 - Grazed Grassland for Corncrakes	135
RP21405A - Mown Grassland for Corncrakes - 1 Aug	119
RP21410C - Mammal and Bird Control - for Black Grouse/Capercaillie	86
RP21405B - Mown Grassland for Corncrakes - 15 Aug	62
RP21404 - Mown Grassland for Corn Buntings	57
RP21407 - Creation and Management of Cover for Corncrakes	47
RP21411B - Supplementary Food Provision for Raptors - Golden Eagles	6
RP21412A - Wardening for Golden Eagles - Farm unit	2
RP21411A - Supplementary Food Provision for Raptors - Hen Harriers	1
Non- native species control	
RP21413E - Control of grey squirrel for red squirrel conservation	100
RP21413A - Control of invasive non-native species - Rhododendron	27
RP21410A - Mammal and Bird Control - Predator control	16
RP21413C - Control of invasive non-native species - Giant Hogweed	6
RP21413B - Control of invasive non-native species - Japanese Knotweed	5
RP21413F - Control of grey squirrel for broadleaf woodland protection	2
RP21410B - Mammal and Bird Control - crow control	18
Habitat management	
RP21433A - Hedgerows - 3 years for biodiversity benefits	1601
RP21414 - Management of Species Rich Grassland	1131
RP21403 - Mown Grassland for Wildlife	947
RP21417 - Management of Habitat Mosaics	635
RP21435A - Grass Margins and Beetlebanks - mixed arable	488
RP21427 - Management of Moorland Grazing	343
RP21434 - Extended hedges	338
RP21416 - Creation and Management of Species Rich Grassland	278
RP21439 - Scrub and Tall Herb Communities	274
RP21415 - Bracken Management Programme for Habitat Enhancement	269
RP21441A - Conservation Management for Small Units - Individual	239
RP21429 - Moorland - Stock Disposal	222
RP21432 - Muirburn and Heather Swiping	213
RP21433B - Hedgerows - 2 years for landscape benefits	161
RP21430 - Away-Wintering of Sheep	138
RP21442B - Grazing Management of Cattle - Introduction	130
RP21436A - Biodiversity Cropping on In-Bye - basic management	107
RP21442A - Grazing Management of Cattle - Retention	93
RP21431 - Off-Wintering of Sheep	92
RP21428 - Moorland Grazings on Uplands and Peatlands	67
RP21437A - Cropped Machair - with FYM/seaweed	43
RP21441B - Conservation Management for Small Units - Collective	38

RP21425 - Lowland Heath	27
RP21426 - Wildlife Management on Upland and Peatland Sites	26
RP21440 - Arable reversion to grassland	24
RP21437B - Cropped Machair - with FYM/seaweed and binder/stooks	18
RP21438A - Ancient Wood Pasture - In-bye Land	14
RP21437D - Cropped Machair - without FYM/seaweed, with binder/stooks	11
RP21438B - Ancient Wood Pasture - Rough Grazing	11
RP21435B - Grass Margins and Beetlebanks - organic	11
RP21436B - Biodiversity Cropping on In-Bye - with binders/stooks	2
RP21437C - Cropped Machair - without FYM/seaweed	7
Organic farming	
RP21401F - Maintenance of organic farming - improved grassland	100
RP21401E - Maintenance of organic farming - arable	78
RP21401H - Maintenance of organic farming - rough grazing	78
RP21401B - Conversion to organic farming - improved grassland	51
RP21401A - Conversion to organic farming - arable	44
RP21401D - Conversion to organic farming - rough grazing	37
RP21401C - Conversion to organic farming - fruit and veg	10
RP21401G - Maintenance of organic farming - fruit and veg	5
Water habitat	
RP21421A - Water Margins - Enhance biodiversity	1691
RP21409 - Open Grazed or Wet Grassland for Wildlife	1680
RP21418 - Management of Wetland	1189
RP21421B - Water Margins - reduce diffuse pollution	248
RP21424 - Coastal or Serpentine Heath	131
RP21422 - Management of Flood Plains	120
RP21419 - Create, Restore and Manage Wetland	80
RP21420B - Lowland Raised Bogs - Basic plus Grazing Management	25
RP21423 - Buffer Areas for Fens and Lowland Raised Bogs	24
RP21420A - Lowland Raised Bogs - Basic management	22

Appendix B. Data details

Table 1. Summary of independent variables at parish level (percentage unless otherwise stated)

A, Dependent Variable at parish level	*Data information*	*Source*
Percentage of Holdings uptake per parish (Participation)	This data is derived from both total number of holdings uptake for measure 214 AEP and per options groups per parish 2008 – 2011, and total number of all agri-holdings per parish, 2011. This data was processed in order to provide values that could be standardised. Due to data confidently issues i.e. if there are less than five holdings per parish, data on individual holdings could not to be disclosed. Consequently the data rows were represented as 'contracts' per option, with their associated parish code but not the Main Farm Location Codes (MLC). One holding is able to take up multiple options (average 6 options), therefore 15,322 contracts are associated with AEP measure, and notably this number does not represent the true number of holdings. Therefore data in its original state could not be standardised against the total number of agricultural holdings per parish. In order to derive a more accurate number of holdings per parish, the contracts with matching associated farm characteristics in the same parish were identified. From these values the data was further standardized to adjust to the size of the parish as well as the total number of actual holdings present in that parish area. For the 'percentage of holdings' per parish these were calculated using the following expression: $$\gamma_n = \left[\frac{\sum_{2008}^{2011} a}{\sum 2011\ b}\right] X\ 100$$ The γ_n represents the dependent value 'percentage of participants' according to the AEP measure, or option group; with ***a*** as the total number of beneficiaries in that parish, and ***b*** as the total number of holdings within that parish in 2011. The final percentage values still abide to confidentially guidelines, additionally these results will not be published i.e. map of holding uptake.	Scottish Government: SRDP and agri-census data (2008 – 2011)
Total expenditure per parish per UAA hectare (Payments)	The data 'total expenditure for measure AEP and option groups per parish' was included after processing (following the same method as above) this data was standardised using the following expression: $$Z_n = \left[\frac{\sum_{2008}^{2011} d}{\sum 2011\ e}\right] X\ 100$$ The ***Zn*** represents the final dependent value as the 'total payments per UAA (Utilized Agricultural Area) ha (hectare) per parish' according to the AEP measure, or option group; **d** refers to the total payments (£) per parish, with **e** representing the total number of UAA ha per parish in 2011, obtained from agri-census dataset.	Same as above

B. Explanatory Variables at parish level	***Data information***	***Source***
Ownership:		
Common grazings Owned agricultural area Rented agricultural area seasonal rented agricultural land Seasonal let agricultural land	Each variable was derived from the agri-census dataset; to obtain the standardised value the total ha per parish was calculated, using GIS. Each variable was then calculated as a percentage of ha per parish, by dividing the 'total ha of each variable per parish' by the 'total ha per parish'.	Scottish Government 2010: Scottish Agri-census data via Edina
Farming type:		
Rough grazing Crops and grass Grass land less than 5 years old Grass land more than 5 years old Other land Crops and fallow land Other crops land Unspecified crops land Vegetables land Woodland	Same as above.	Agri-census (2010) Scottish Government via Edina
Density of glasshouses (glass structures) per UAA ha	This data was derived from the 'total number of glasshouses per parish'. This variable was standardised by using the following expression: $\boldsymbol{Y = \frac{A}{B}}$ With ***Y*** representing the average 'density of glasshouses per UAA ha'; with ***A*** 'total number of glasses house per parish' divided by ***B*** the 'total UAA ha per parish'	
Livestock:		
Density cattle per UAA ha Density of sheep per UAA ha Density of beef heifers per UAA ha Density of dairy heifers per UAA ha	This data was derived from the 'total livestock dataset's and 'total UAA ha'. The variables were standardised by using the following expression: $\boldsymbol{Y = \frac{A}{B}}$ With ***Y*** representing each of the livestock explanatory variables as a 'density per UAA ha per parish'; with ***A*** as the 'total number of livestock per parish', and ***B*** as the 'total UAA ha per parish'.	Agri-census (2010) Scottish Government via Edina
Labour:		
Density of Full-time occupiers per holding Density of Part-time occupiers per holding Density of Full-time spouses per holding Density of Part-time spouse per holding Density of regular & casual staff per holding	This data was derived from the total labour dataset and was standardised using the following expression: $\boldsymbol{Y = \frac{D}{E}}$ The dependent ***Y***, as the density of labour variable per parish; with ***D*** as the 'total number of labour per parish', with ***E*** as the 'total number of holdings per parish'.	Agri-census (2010) Scottish Government via Edina
Bio-physical:		
land capable for supporting arable agriculture	The Land Capability for Agriculture (LCA) 1:25000 scale vector dataset is used to "rank land on the basis of its potential for productivity and cropping flexibility. This is determined by the extent to which physical characteristics of the land (soil, climate, and relief) impose on long terms restrictions on its use" (JHI, 2013). Land in the 'arable' class is considered "prime agricultural land, capable of supporting a wide range of crops" (Wright et al., 2013). This data was derived firstly by reclassifying (class 1 to	James Hutton Institute (JHI) (national soils inventory and surveys for Scotland 1978-1987 and 2006-2011) and Scottish Government

	3.1) from the LCA dataset to extract the 'arable' class only; this was converted to parish scale and then calculated as a proportion of total parish size (ha).	
land capable for supporting mixed agriculture	Same as above (extracting 'mixed' class only (class 3.2 to 4.2). Land in this class is considered "capable of being used to grow a moderate range of crops including cereals, forage crops and grass" (Wright et al., 2013).	
land capable for supporting improved agriculture	Same as above (extracting 'improved' class only (class 5.1 to 5.3). Land in this class "has the potential for use as improved grassland… limitations on this land include climate, slope, wetness and other heterogeneous patterns that render even occasional cultivation unsuitable" (Wright et al., 2013).	
land capable for supporting rough agriculture	Same as above (extracting 'rough' class only (class 6.1 to 7). Land on this class "has very severe limitations that prevent sward improvement my mechanical means. The land is either too steep, very poorly drained, has very acidic or shallow oils and occurs in wet, cool climate zones" (Wright et al., 2013).	
Built up areas	Same as above (extracting built up class only (class 888). Land in this class represent's built up/urban areas.	
Inland water area	Same as above (extracting inland water class only (class 999). Land in this class represents inland water e.g. lochs, rivers etc.	
Protected Areas		
SSSI area	The SSSI (Sites of Special Scientific Interest) are those areas of land and water that Scottish Natural Heritage (SNH) considers to best represent it's natural heritage, many of which are designated as Natura sites (Scottish Government , 2012). This data is derived from the spatial SSSI vector dataset using GIS to reclassify to simplify the data class this was converted to parish scale. The variable was standardised as a proportion of total parish size (ha).	Scottish Government (2012) via Scottish Natural Heritage, natural spaces
Complete national designated areas	This data is derived from SSSIs, SACs (Special areas of conservation), SPAs (Special protected areas) and Ramsar sites spatial datasets. The four datasets where merged and reclassified, and converted to parish scale. The variable was standardised as a proportion of total parish size (ha).	As above.
RSPB reserve areas	The RSPB (Royal Society for the protections of birds) reserve data is derived independently from the spatial RSPB Scotland vector dataset using GIS to reclassify the data the convert to parish scale. The variable was standardised as a proportion of total parish size (ha).	RSPB (2012)
Rural –urban classification:		

large urban areas Other urban areas Accessible small towns areas Remote small towns' areas Accessible rural areas Remote rural areas	The Scottish Government (SG) Urban/Rural 6 fold classification system provides a consistent way of defining urban and rural areas across Scotland. The classification is based upon two main criteria: (i) population as defined by the General Register Office for Scotland (GROS), and (ii) accessibility based on drive time analysis to differentiate between accessible and remote areas in Scotland (Scottish Government 2010b). Each class was based on the following: Large Urban Areas =Settlements of over 125,000 people. Other Urban Areas= Settlements of 10,000 to 125,000 people. Accessible Small Towns= Settlements of between 3,000 and 10,000 people and within 30 minutes' drive to a settlement of 10,000 or more. Remote Small Towns= Settlements of between 3,000 and 10,000 people and with a drive time of over 30 minutes to a settlement of 10,000 or more. Accessible Rural= Areas with a population of less than 3,000 people, and within a 30 minute drive time of a settlement of 10,000 or more. Remote Rural= Areas with a population of less than 3,000 people, and with a drive time of over 30 minutes to a settlement of 10,000 or more Each classification was converted to standardised variables, were areas (ha) per class type were calculated then converted to parish scale. Then each class was standardised as a proportion of total parish size (ha).	Scottish Government (2010) Scottish government rural urban classification 2009- 2010

Appendix C. Model results

Table 1. Model results for payments per UAA ha for AEP measure

Variables	Mean	SD	OLS model		Spatial lag		Spatial error	
Common grazings	2.92	12.60	0.38	**	0.18	ns	0.01	ns
Total rough grazing	19.89	21.60	-0.25	*	-0.15	ns	-0.20	ns
Total woodland	4.39	5.59	-0.71	**	-0.48	.	-0.50	*
Glass houses per UAA	0.93	6.08	-0.47	.	-0.23	ns	-0.15	ns
LCA Mixed	34.86	26.60	0.34	***	0.21	**	0.23	*
LCA rough	21.27	28.70	-0.44	***	-0.27	**	-1.48	***
Built up areas	4.20	13.50	-0.63	***	-0.36	**	-0.51	**
SSSI area	6.00	11.50	0.50	**	0.48	**	0.69	***
RSPB reserve areas	0.43	3.01	1.69	**	1.02	.	0.88	ns
Other urban areas	2.26	8.44	-0.52	**	-0.35	.	-0.29	ns
Accessible small towns areas	0.55	2.20	-1.31	.	-0.35	ns	0.25	ns
Accessible rural areas	48.47	42.70	-0.26	***	-0.14	*	-0.25	***
Rho / Lambda					0.51	***	0.54	***
constant			54.60	***	27.44	***	55.30	***
R_2 / pseudo R_2			0.12		0.36		0.37	
LOG-L			-4827.29		-4720.71		-4721.47	
AIC			9680.58		9469.42		9468.94	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 2. Model results for percentage of uptake per parish for whole AEP measure

Variables	Mean	SD	OLS model		Spatial lag		Spatial error	
Rented agricultural area	16.92	14.80	0.07	***	0.05	**	0.06	****
Seasonal rented	4.89	4.24	0.11	.	0.08	ns	0.05	ns
Seasonal let	7.25	6.79	-0.09	**	-0.08	.	-0.06	ns
Total other crops land	0.06	0.10	-4.38	.	-3.69	ns	-3.30	ns
LCA supporting arable	22.51	30.06	0.03	**	0.02	*	0.02	ns
LCA supporting Mixed	34.86	26.64	0.07	***	0.06	***	0.07	***
Inland water area	0.93	2.10	-0.28	**	-0.21	**	-0.22	.
Density of dairy heifers	0.01	0.17	-4.22	**	-4.70	**	-5.03	***
Density of regular & casual staff	0.55	0.85	3.40	***	3.25	***	3.32	***
SSSI area	6.00	11.48	0.24	***	0.23	***	0.25	****
designated areas	7.21	13.97	-0.12	**	-0.12	*	-0.13	****
Other urban areas	2.26	8.44	-0.09	**	-0.07	*	-0.07	**
Accessible rural areas	48.47	42.69	-0.03	**	-0.02	*	-0.02	*
Rho/ lambda					0.32	***	0.34	***
constant			1.34	.	-0.36	ns	1.66	.
R_2 / pseudo R_2			0.16		0.25		0.25	
LOG L			-3088.30		-3057.80		-3058.30	
AIC			6271.72		6145.59		6144.53	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 3. Model results for payments per UAA ha for Habitat management options

Variables	Mean	SD	OLS model		Spatial lag		Spatial error	
Common grazings	2.92	12.55	0.21	*	0.14	ns	0.18	ns
Total other crops land	0.06	0.10	87.18	***	70.68	***	82.68	***
Total unspecified crops land	0.05	0.09	-111.82	***	-92.20	***	-107.10	***
Total woodland	4.39	5.59	-0.38	.	-0.25	ns	-0.33	ns
Glass houses per UAA ha	0.93	6.08	-0.33	.	-0.12	ns	-0.07	ns
LCA supporting arable	22.51	30.06	0.37	***	0.16	***	0.19	**
LCA supporting Mixed	34.86	26.64	0.55	***	0.27	***	0.33	***
Other urban areas	2.26	8.44	-0.45	**	-0.26	*	-0.21	ns
Accessible small towns areas	0.55	2.20	-0.99	.	-0.19	ns	0.22	ns
Accessible rural areas	48.47	42.69	-0.18	***	-0.08	*	-0.10	.
Rho/ lambda					0.58	***	0.60	***
constant			7.27		2.07	ns	13.30	**
R_2 / pseudo R_2			0.10		0.42		0.42	
LOG L			-4556.28		-4405.58		-4407.50	
AIC			9134.55		8835.16		8837.00	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 4. Model results for percentage of uptake per parish for Habitat management options

Variables	Mean	SD	OLS		Spatial lag		Spatial error	
Rented agricultural area	16.92	14.80	0.04	**	0.04	*	0.04	*
Seasonal rented agricultural land	4.89	4.24	0.12	.	0.09	ns	0.06	ns
Total grass land >5 years old	11.19	6.51	-0.11	.	-0.10	*	0.06	ns
Total other crops land	0.06	0.10	-3.53	ns	-3.00	ns	-2.54	ns
LCA supporting arable	22.51	30.06	0.05	***	0.04	**	0.03	*
LCA supporting Mixed	34.86	26.64	0.08	***	0.07	***	0.07	***
Inland water area	0.93	2.10	-0.25	**	-0.20	.	-0.22	.
Density cattle per UAA ha	0.58	1.21	-1.12	***	-0.91	**	-0.92	***
Density of sheep per UAA ha	1.51	1.66	0.39	.	0.29	ns	0.27	ns
Density of dairy heifers per UAA ha	0.01	0.17	-3.34	**	-3.92	**	-4.17	**
Density of Full-time occupiers	0.12	0.20	3.58	ns	3.37	ns	4.48	*
Density of regular & casual staff	0.55	0.85	3.09	***	2.90	***	2.79	***
SSSI area	6.00	11.48	0.21	***	0.20	***	0.23	***
Complete national designated areas	7.21	13.97	-0.13	***	-0.13	***	-0.14	***
RSPB reserve areas	0.43	3.01	0.14	ns	0.10	ns	0.07	ns
Other urban areas	2.26	8.44	-0.07	**	-0.05	.	-0.05	.
Accessible rural areas	48.47	42.69	-0.03	***	-0.02	**	-0.03	**
Rho /Lambda					0.31	***	0.33	***
constant			0.94	ns	-0.40	ns	1.38	ns
R_2 / pseudo R_2			0.17		0.25		0.26	

LOG L	-3049.67	-3020.83	-3021.33
AIC	6135.33	6079.66	6078.67

Table 5. Model results for payments per UAA ha for bird conservation options

Variables	Mean	SD	OLS model		Spatial lag		Spatial error	
Common grazings	2.92	12.55	0.10	**	0.08	**	0.08	*
Owned agricultural area	53.70	27.13	-0.04	**	-0.04	**	-0.04	**
LCA rough agriculture	21.27	28.71	-0.09	***	-0.09	***	-0.10	***
Built up areas	4.20	13.50	-0.09	**	-0.09	**	-0.09	*
SSSI area	6.00	11.48	0.15	***	0.15	***	0.16	***
RSPB reserve areas	0.43	3.01	0.85	***	0.80	***	0.79	***
Accessible rural areas	48.47	42.69	-0.03	**	-1.03	**	-0.03	*
Rho /Lambda					0.13	**	0.10	*
constant			7.47	***	7.00	***	7.92	***
R_2 / pseudo R_2			0.11		0.13		0.13	
LOG L			-3405.94		-3402.13		-3403.93	
AIC			6827.88		6822.26		6823.87	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 6. Model results for percentage of uptake per parish for bird conservation options

Variables	Mean	SD	OLS model		Spatial lag		Spatial error	
Common grazings	2.92	12.60	0.03	ns	0.03	ns	0.02	ns
Rented agricultural area	16.92	14.80	0.03	.	0.02	.	0.02	.
Total grass land > 5 years	11.19	6.51	-0.08	**	-0.08	.	-0.08	*
Total crops and fallow land	7.06	6.14	0.18	***	0.19	***	0.18	***
Total other crops land	0.06	0.10	-3.27	ns	-3.08	ns	-3.00	ns
Total vegetables land	0.19	0.30	-3.09	***	-3.16	***	-3.16	***
LCA supporting Mixed	34.86	26.60	0.02	.	0.02	.	0.02	.
LCA supporting improved	16.24	16.00	-0.03	*	-0.03	*	-0.03	*
LCA supporting rough	21.27	28.70	-0.06	***	-0.05	***	-0.06	***
Inland water area	0.93	2.10	-0.22	**	-0.20	*	-0.20	.
Density cattle per UAA ha	0.58	1.21	-0.79	***	-0.73	**	-0.73	**
Density of sheep per UAA	1.51	1.66	0.26	ns	0.23	ns	0.24	ns
Density of dairy heifers	0.01	0.17	-3.74	**	-4.00	***	-4.02	***
Density of regular & casual	0.55	0.85	2.97	***	2.93	***	2.94	***
SSSI area	6.00	11.50	0.16	***	0.15	***	0.16	***
Complete national designated	7.21	14.00	-0.09	**	-0.09	**	-0.09	**
RSPB reserve areas	0.43	3.01	0.19	**	0.17	*	0.16	*
Other urban areas	2.26	8.44	-0.07	**	-0.06	**	-0.07	**
Accessible rural areas	48.47	42.70	-0.02	***	-0.02	**	-0.02	**
Rho/Lambda					0.12	**	0.11	*
constant			4.17	***	2.91	***	3.38	***

R_2 / pseudo R_2	0.16	0.19	0.18
LOG L	-2871.40	-2867.99	-2868.94
AIC	5782.81	5777.97	5777.88

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 7. Model results for payments per UAA ha for water habitat options

Variable	Mean	SD	OLS model		spatial lag		Spatial error	
Common Grazings	2.92	12.55	0.09	**	0.04	ns	-0.01	ns
Seasonal rented agricultural land	4.89	4.24	0.14	.	0.14	ns	0.15	.
Total woodland	4.39	5.59	-0.21	**	-0.17	**	-0.17	*
Density of Total glass houses	0.93	6.08	-0.11	.	-0.08	ns	-0.09	ns
LCA supporting Mixed	34.86	26.64	0.11	***	0.08	***	0.08	***
LCA supporting rough	21.27	28.71	-0.06	**	-0.05	*	-0.07	**
Built up areas	4.20	13.50	-0.09	*	-0.06	*	-0.08	*
Density cattle per UAA ha	0.58	1.21	-1.00	*	-0.93	*	-1.13	*
Density of sheep per UAA ha	1.51	1.66	1.06	***	0.96	**	1.18	***
SSSI area	6.00	11.48	0.27	***	0.22	**	0.24	***
Complete national designated areas	7.21	13.97	-0.11		-0.07	ns	-0.06	ns
RSPB reserve areas	0.43	3.01	0.36	**	0.24	.	0.19	ns
Accessible small towns areas	0.55	2.20	-0.27	.	-0.17	ns	-0.09	ns
Accessible rural areas	48.47	42.69	-0.04	***	-0.03	**	-0.04	**
Rho /Lambda					0.33	***	0.35	***
constant			4.81	***	2.79	*	5.73	***
R_2 / pseudo R_2			0.14		0.23		0.23	
LOG L			-3453.33		-3419.07		-3423.68	
AIC			6936.66		6870.13		6877.35	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Table 8. Model results for percentage of uptake per parish for Water habitat options

Variable	Mean	SD	OLS model		spatial lag		Spatial error	
Rented agricultural area	16.92	14.80	0.04	**	0.04	**	0.04	**
Total grass land > 5 years	11.19	6.51	-0.07	*	-0.06	*	-0.05	.
Total crops and fallow land	7.06	6.14	0.12	*	0.13	**	0.12	*
Total unspecified crops land	0.05	0.09	-6.33	*	-6.09	*	-6.05	*
Total vegetables land	0.19	0.30	-1.45	ns	-1.67	.	-1.47	ns
Density of Total glass	0.93	6.08	-0.06	.	-0.04	ns	-0.05	ns
LCA supporting Mixed	34.86	26.60	0.05	***	0.04	**	0.05	***
LCA supporting rough	21.27	28.70	-0.03	*	-0.02	**	-0.03	*
Built up areas	4.20	13.50	-0.09	***	-0.06	***	-0.07	***

Inland water area	0.93	2.10	-0.34	***	-0.26	**	-0.25	***
Density cattle per UAA ha	0.58	1.21	-0.83	***	-0.78	***	-0.88	*
Density of Full-time	0.12	0.20	4.25		3.54	ns	3.63	.
Density of Part-time	0.33	0.57	2.01	*	1.96	*	2.26	**
SSSI area	6.00	11.50	0.16	***	0.15	***	0.17	***
Complete national designated areas	7.21	14.00	-0.09	*	-0.08	**	-0.09	**
RSPB reserve areas	0.43	3.01	0.11	ns	0.07	ns	0.05	ns
Accessible small towns areas	0.55	2.20	-0.25	**	-0.19	*	-0.14	ns
Accessible rural areas	48.47	42.70	-0.02	***	-0.01	**	-0.02	**
Rho / lambda					0.37	***	0.39	***
constant			4.17	***	2.13	**	4.13	***
R_2 / pseudo R_2			0.18		0.28		0.28	
LOG L			-2888.70		-2845.82		-2848.00	
AIC			5815.40		5731.64		5733.90	

. p >0.1, * p >0.05, ** p> 0.001, *** p >0.0001, ns = not significant

Appendix D. KW significant test results

Table 1. KW significant test results for job role					
Stakeholder	**H**	**Chi-square probability**	**Group**	**Group Size**	**Mean rank**
RPAC core members (interest)	9.21	0.03	Case officer	22	20.02
			Coordinator	13	34.35
			RPAC	11	32.09
			Scottish Government	9	33.33
Rural business (influence)	7.83	0.05	Case officer	15	17.77
			Coordinator	9	15.83
			RPAC	8	30.19
			Scottish Government	9	23.39

Table 2. KW test results for organisation					
Stakeholder	**H**	**Chi-square probability**	**Group**	**Group size**	**Mean rank**
NPAC (influence)	7.59	0.05	SNH	13	27.62
			FCS	11	16.18
			SGRPID	22	30.82
			Scottish Government	5	22.20
RPAC member core (influence)	8.67	0.03	SNH	16	26.56
			FCS	11	17.82
			SGRPID	23	34.59
			Scottish Government	5	24.70
RPAC member wider (influence)	9.60	0.02	SNH	16	26.25
			FCS	11	18.32
			SGRPID	23	34.70
			Scottish Government	5	20.00
Scottish Government (influence)	7.66	0.05	SNH	14	28.75
			FCS	10	16.65
			SGRPID	21	29.55
			Scottish Government	5	17.10
RPAC chair (interest)	8.24	0.04	SNH	16	23.81
			FCS	11	37.45
			SGRPID	23	29.17
			Scottish Government	5	15.20
RSPB (interest)	8.60	0.03	SNH	16	31.25
			FCS	10	14.35
			SGRPID	21	27.52
			Scottish Government	5	31.30